USAID/UGANDA SO 7 ASSESSMENT OF STRATEGIC AGRICULTURE & ENVIRONMENT OPTIONS

Task Order No. 810 under the Biodiversity & Sustainable Forestry (BIOFOR) IQC

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USAID

CHEMONICS

Acknowledgements

The strategic options team collectively agreed that this was among the most challenging assignments that its individual members have participated in. Arriving at a final product that will hopefully be of value to the Mission was an effort filled with twists and turns. Initially, the task was seemingly simple. However, as the work unfolded and pieces were developed and discarded, it was clear that the final package of outputs was to become more complex than either the Mission or the team anticipated.

Much of the frustration and satisfaction in putting this product together stems from the recognition that while this report contains much valuable information and a useful methodology for helping to make strategic choices, the process of translating that into specific program interventions is only just beginning. Much remains to be done that a short-term consultancy cannot hope to accomplish. That challenge is left to those who are resident in Uganda.

We wish to express great appreciation to the senior staff of USAID/Uganda, who gave so unstintingly of their time. None of us can recall a similar situation where the entire senior echelon of a Mission met so frequently with a consulting team (including a late evening session) to keep abreast of our progress and to exchange views about the needs of the Mission and the country. Special thanks go to Dawn Liberi, Director, Patrick Fleuret, Deputy Director, Ron Stryker, SO1Team Leader, and Bob Buzzard, SO2 Team Leader for their insights, willingness to share information and concern for our well being.

The team also wishes to express its gratitude to the staff of Chemonics for the high level of support it provided and for the unfailing good spirits of all who participated in this project.

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ACRONYMS

AFRENA	Agroforestry Research Networks for (East and Central) Africa
BIOFOR	Biodiversity and Sustainable Forestry
CIAT	International Centre for Tropical Agriculture
DEAP	District Environmental Action Planning
EU	European Union
FAO	United Nations Food and Agriculture Organization
GDP	Gross Domestic Product
GNP	Gross National Product
GOU	Government of Uganda
ICRAF	International Centre for Research in Agroforestry
IFDC	International Fertilizer Development Centre
ISP	Integrated Strategic Plan
KARI	Kawanda Agricultural Research Institute
MFPED	Ministry of Finance, Planning, and Economic Development
NARO	National Agricultural Research Organization
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NGO	Non-governmental organization
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
SO	strategic objective
SOE	State of the Environment
UNHS	Uganda National Household Survey
UNP	Uganda National Parks
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority
WSSP	Wetland Sector Strategic Plan

Executive Summary

I. Purpose of the Assessment

The purpose of this assessment is to help USAID/Uganda and its partners focus scarce SO7 development resources on interventions that offer significant prospects of influencing environmentally sustainable growth. Choices need to be made about where to locate those resources. The assessment will help inform the process by which those choices are made.

The Mission is developing a new Integrated Strategic Plan for FY2002-2007. As part of that process the Mission is planning to merge its Strategic Objectives (SOs) in the areas of economic growth and environment. This is in large measure a response to Uganda's stated goal of eradicating poverty. Since Uganda is (and for the foreseeable future will continue to be) primarily an agriculturally based economy with large numbers of subsistence farmers, any efforts to raise per capita income must engage that target population. And at that local level the twin issues of productivity and environmental sustainability are joined, providing a strong rationale for the proposal to merge two different but closely related SOs. Doing so would enable the Mission to better address overlapping concerns about the sustainable use of natural resources that are manifestly evident at the grassroots levels of society. It would also mirror the efforts of Government to devolve authority to District levels and below, where the organizational differences between economic growth/agriculture and the environment are largely cosmetic.

II. Results of the Assessment

The Chemonics/BIOFOR team has been working closely with the proposed USAID/Uganda SO7 team and with the guidance of Mission management to develop four related information packages. Each of the packages will hopefully provide the Mission with useful insights into the process of deciding 'why, which and where' the next generation of USAID investments should take place. "How and when" are subjects the Mission will need to wrestle with at the next stage of program development.

The packages consist of the following: (1) overviews of seven critical trends that either impact on or are the result of the way land is used (or misused); (2) a strategic framework for helping the Mission to decide among potential SO7 interventions, including a discussion of data gaps; (3) a method of choosing among geographic areas to make investments that uses selective criteria; and, (4) a discussion of four strategic policy issues that need to be considered prior to developing new initiatives.

A. Critical Trends

The first of the information packages includes brief overviews of seven areas of concern regarding Uganda's sustainable use of natural resources, including related factors that impact on land use. These were winnowed from a broader list of concerns arrived at during our work in compiling information on land use. They include the following: population, poverty, declining

agricultural productivity, deforestation, loss of biodiversity and agro-biodiversity, deterioration of wetlands and fisheries, and land tenure. The individual discussions seek to highlight the reasons for our concern and the trends that have already emerged or will become more evident over the near term.

Next, a review of the Ugandan policy environment highlights key pieces of legislation and policy that shape the context for Government's objective of eradicating poverty. We assess the most significant of these to be the Poverty Eradication Action Plan (PEAP), the Plan for Modernization of Agriculture (PMA) and the Local Governments Act. This is followed by a matrix indicating where Uganda's donor partners are focusing their resources and energies as well as insights we obtained in discussions with several donors.

B. A Decision-making Framework for Investment Choices

The second information package suggests an approach and a framework for making decisions among potential choices. The approach proposes a unifying theme for SO7's portfolio – the sustainable use of natural resources. It presents the theme against the backdrop of a Problems/Solution Cycle, with a suggested emphasis on focusing investments in changing land use practices. This point of intervention in the complex system of production encompasses consideration of environment, natural resources, economic growth and technology transfer issues.

The subsequent framework seeks to make explicit a decision-making process that is generally implicit. Its objective is to get agreement upon a common set of openly agreed upon criteria that will be used in a structured evaluation of new program proposals. The screening process passes each potential investment opportunity through an increasingly stringent analysis of options, designed to inform decision-makers about the strategic implications of their choices. Although no structure can accurately encompass the range of factors that makes up decision making with the Mission, the approach outlined here can be a useful framework to guide discussion and debate. The expected outcome would be a mix of interventions at the SO7 program level whose sum total represents a portfolio that is balanced and fully congruent with Ugandan priorities and USAID policy directives.

This is followed by a discussion of data. Misgivings about the accuracy and reliability of important data sets constrain our confidence in many of the numbers that we present. Where numbers are unavailable or obviously inaccurate, we discuss the reasoning behind our analysis and the rationale for our assumptions about why existing problem areas will worsen or deteriorate. This was included in the individual critical trends sections (Section II.A) as well as in a separate discussion of data gaps and suggestions for important additions to the database. The role of IFPRI is also discussed.

C. Criteria Based Selection of Investment Options

The third information package consists of a methodology for making investment decisions that highlights specific criteria used to define, compare and rank different geographic areas (districts and clusters of districts) in Uganda. Although any number of criteria could be considered, the Mission suggested an initial three that it asked we focus on – first, potential increases in

agricultural productivity; second, population pressure on selected natural resources; and, third, the incidence of poverty.

These three criteria were overlaid on the sample universe, first individually and then interactively, to arrive at three 'district clusters' that share certain similarities and characteristics where the Mission might consider making investments. These district clusters were then passed through our 'qualitative filtering system" (Filter #1, the coarse filter). The results should generate the sort of structured discussion about choices that the Mission desires.

The limitations of this methodology are discussed, including the likelihood that many other factors would or should be considered. However, it does illustrate how a measure of objective robustness can be introduced into the decision-making process.

D. Strategic Level Policy Issues

The fourth and final information package presents a discussion of four strategic policy issues that we believe need to be taken into consideration in USAID's development of any new initiatives for Uganda. Possibly the two most critical of these are (1) the proliferation of GOU priorities and the financial and human resource implications that this represents, and (2) the policy and implementation opportunities and issues accompanying the devolution of power, responsibility and resources to District and below levels of government. The need to focus on capacity building to realize the full benefits of decentralization becomes very evident.
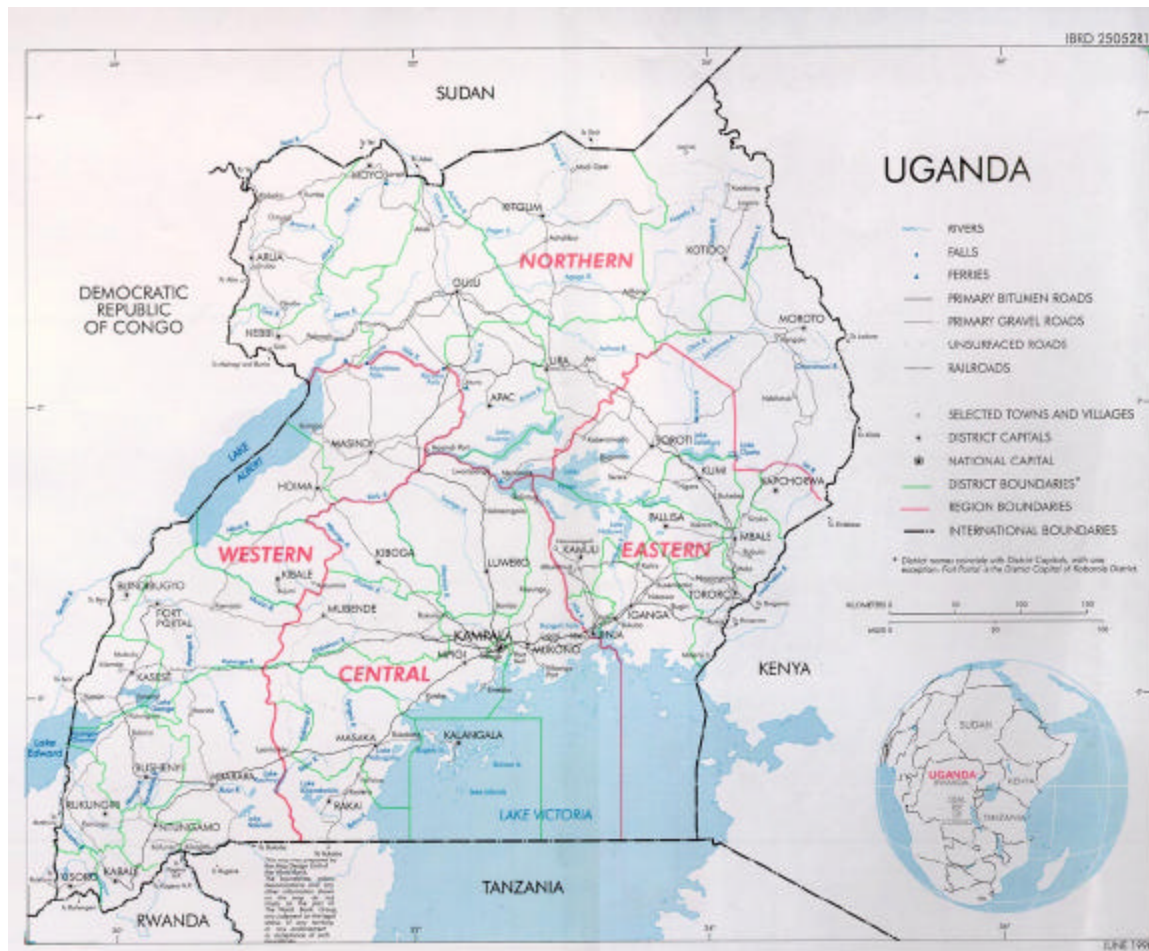
Introduction

USAID/Uganda is developing a new Integrated Strategic Plan for FY2002-2007. In support of Uganda's goal of eradicating poverty, set forth in the Government's Poverty Eradication Action Plan, the Mission has decided to merge its economic growth and environment Strategic Objectives (SOs). The new SO will more efficiently address cross-cutting issues involved in creating an enabling environment for achieving sustainable development. This paper examines the options for integrating economic growth, agricultural modernization and environmental management/biodiversity conservation.

USAID/Uganda funded the strategic options team under a contract with Chemonics International through the Biodiversity and Sustainable Forestry (BIOFOR) IQC, Task Order 810. The team consisted of Laurence Hausman (Team Leader), Richard Smith (Environment/NRM Specialist), Jonathan Greenham (Product and Market Development Specialist), Shelagh Huston (Natural Resource Economist), Julius Zake Agricultural Development Specialist), Joel Arumadri (GIS/Remote Sensing Specialist), Nelson Omagor NRM Specialist), and Robert Mark (Field Project Administrator). The team conducted its in-country work from March 14 to April 11, 2001.

The team undertook an extensive document search to collect and analyze information on Uganda's environment, agriculture, and planning sectors, and held numerous meetings with individuals and officials from government agencies, other donors, the private sector and the NGO community. In addition, to accommodate to time constraints, the team split into two groups to carry out brief but very useful field visits to the north and southwest of the country.

Rather than duplicating research already undertaken and presented in strategy and project documents, the team borrowed freely from these documents, and synthesized and adapted information where appropriate. In addition, it developed both a new strategic decision-making model and a methodology for selecting districts that would help meet the new SO7 objectives.

In addition to this report, the team was encouraged to provide additional data and share a number of insights in a separate memorandum to the USAID Director. This will be forwarded shortly.

IBRD 250528?

UGANDA

SUDAN

NORTHERN

DEMOCRATIC
REPUBLIC
OF CONGO

MOYO
KITGUM
ARUA
KOTIDO
GULU
MOROTO
NEBBI
LIRA
APAC
SOROTI
MASINDI
KUMI
HOIMA
NAPCHORWA
BALISA
KIBOGA
KAMULI
MBALE
WESTERN
KIBALE
LUWERO
EASTERN
BURUNGUGYO
MUBENDE
TORORO
FORT
PORTAL
IGANGA
KASESE
CENTRAL
KAMPALA
MPOI
MUKONO
JINJA

LAKE
ALBERT

KENYA

MASAKA
KALANGALA

RUBIRIZI
MBARARA
RAKAI

RUKUNGIRI
LAKE VICTORIA

Lake
Edward

NTUNGAMO

KISORO KABALE

TANZANIA

RWANDA

RIVERS
FALLS
FERRIES
PRIMARY BITUMEN ROADS
PRIMARY GRAVEL ROADS
UNSURFACED ROADS
RAILROADS

SELECTED TOWNS AND VILLAGES
DISTRICT CAPITALS
NATIONAL CAPITAL
DISTRICT BOUNDARIES*
REGION BOUNDARIES
INTERNATIONAL BOUNDARIES

* District names coincide with District Capitals, with one
exception: Fort Portal is the District Capital of Kabarole District.

KILOMETERS 0   50   100   150
MILES 0   50   100

SUDAN

UGANDA

KENYA

TANZANIA

JUNE 1996

Land Use in Uganda

A. Critical Trends

Increasing numbers of rural subsistence farmers are straining Uganda's resources. District figures suggest that some areas are of particular concern: Per capita availability of good arable land is declining, and reductions in forest and woodland are leading to localized shortages, declines in soil fertility and productivity, and continuing wetland degradation.

After analyzing current land use, the team has identified critical trends in seven areas likely to affect SO 7 objectives that the mission will wish to consider when examining potential interventions: population, poverty, declining agricultural productivity, deforestation, declining biodiversity and agro-biodiversity, degradation of wetlands and fisheries, and land tenure. Given limitations in time and the data available, these can be summarized here only briefly in order to suggest their value.

Population of Uganda
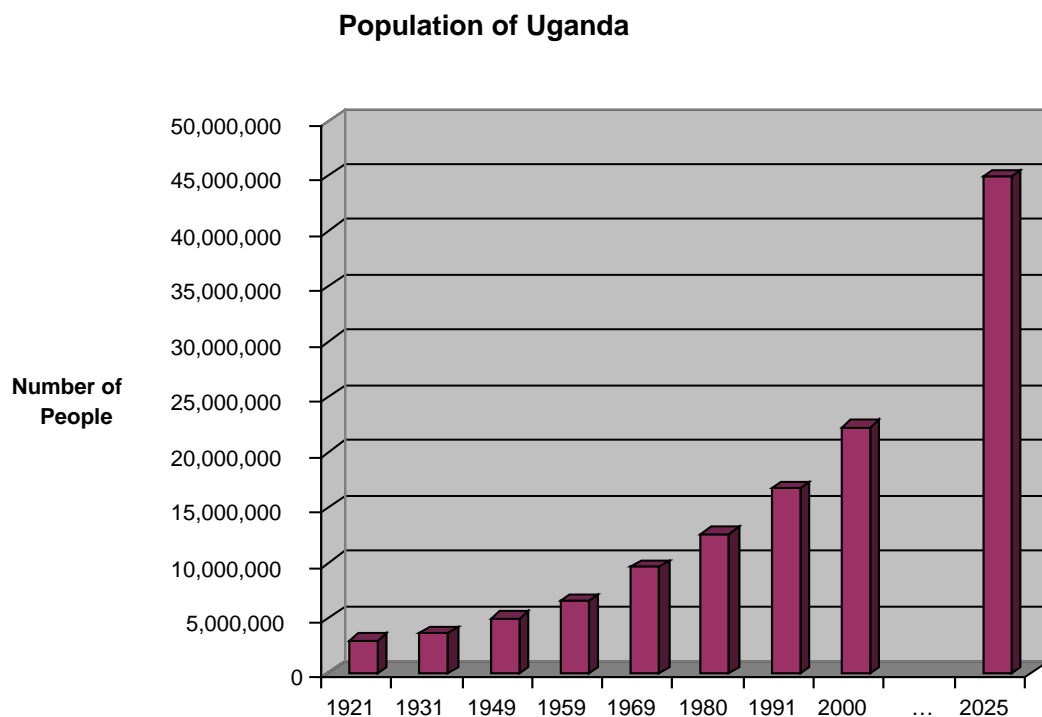
A1. Population

In 1921, the population of Uganda was under 3 million people. Over the next 60 years, the population more than quadrupled, to almost 13 million in 1981. By 2001, only 20 years later, the population had swelled to an estimated 23 million.

Assuming the current rate of increase (2.9%), the UN's median projection for the population of Uganda in 2025 is 45 million; even a gradual reduction in the growth rate to 2.5 percent would still result in a population in 2025 of between 37 and 41 million in 2025.

Several concerns about population trends need to be highlighted: An estimated 19 million people — 86 percent of the population — live in rural areas. Most depend heavily on subsistence agriculture for their livelihood. When there were fewer people it was possible to sustain soil fertility by allowing land to lie fallow for a time under the traditional system of cultivation. Now, a far larger population has forced a reduction in fallow periods, while poverty precludes the use of advanced technology to redress the balance. As discussed in section II.A.3, the land base is being used in an unsustainable fashion, which will inevitably result in declining productivity.

Population Density

Population density varies across regions — from $187/\text{km}^2$ in the east to $50/\text{km}^2$ in the north — with a national average of about $100/\text{km}^2$. Variations between districts are even more striking. The three most sparsely populated districts in the central and northern regions have fewer than 20 persons per km^2; in the three districts with substantial urban populations, the range is from 400 to $4,600/\text{km}^2$.

The rate at which density is rising is noteworthy. For every 10 persons who were in the region in 1991, there are now about 15 in the eastern region, 12 in the central, and about 13 each in the northern and western. As Table 1 illustrates, despite being much the smallest region, the population in the eastern region has increased by almost 2 million in 10 years (3.7 million in 1991 to 5.7 million in 2000), notwithstanding the fact that the region is without major urban centers.

Given current farming practices, the shrinking amount of land per capita threatens the capacity of the population to feed itself (discussed further in II.C.3, Declining Productivity). Although food self-sufficiency is not necessary for food security, the alternatives are to modify farming practices or to provide other sustainable sources of income for the purchase of food. This will be a tremendous challenge for Uganda.

Table 1. Increases in Population Density 1991–2000

Region	Total Land Area sq. km. (excludes water)	Census Population 1991	Estimated Population 2000	Population Density (#/km^2) 1991/ Total Land	Population Density (#/km) 2000/ Total Land	Increase since 1991 %
East	30,260	3,698,079	5,658,600	122.2	187.0	53.0%
Central	52,709	5,273,984	6,185,400	100.1	117.4	17.3%
North	84,443	3,151,955	4,220,800	37.3	50.0	33.9%
West	55,278	4,547,687	6,172,600	82.3	111.7	35.7%
Total	**222,690**	**16,671,705**	**22,237,400**	**74.9**	**99.9**	**33.4%**

The trend in Uganda is exacerbated by the fact that cropland per person is shrinking throughout the world. If other countries can afford to import the food they can no longer grow on their own land, world food prices will inevitably rise, making it harder for poorer countries to sustain their people through imports.

Orphans and Dependency

Because of the civil strife in the 1970s and 1980s and the HIV/AIDS crisis in the 1990s, Uganda now has between 330,000[1] and 1.7 million[2] orphans. Moreover, because some 1.8 million people are already HIV-positive, the majority of them adults in their productive years, it is estimated that by 2010 this burden will increase to 2.1 million orphans, representing 13.6 percent of all children under 15. On a per-capita basis, each working adult in Uganda must support 1.22 dependent children and elderly persons — reportedly the highest dependency ratio in the world.

Because more than half of all Ugandans are under 16, there will be some 10 million new entrants into the job market in the next 15 years. That will almost certainly exceed the capacity of the agricultural sector to absorb even if agricultural growth is rapid. Room must be made for more entrants into the industrial and service sectors, especially since they have the potential for more rapid growth.

HIV/AIDS

Uganda has made great strides in combating the HIV/AIDS epidemic. It the past decade it has reduced the HIV prevalence from as much as 30 percent in some areas to a national average of 8.3 percent. Nevertheless, AIDS remains the leading cause of death among adults in Uganda, exceeding malaria. The AIDS rate is highest among those aged 15 to 49 — the most productive members of society.

The impact of AIDS is felt broadly, from reduced productivity and efficiency to reduced or delayed professionalization, lack of capacity to save and invest, erosion of social capital, and

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[1] Uganda Bureau of Statistics, *Uganda National Household Survey 1999/2000: Report on the Socio-Economic Survey*, Entebbe, Uganda: 2001.

[2] Lichte, John, et al. "Uganda Food Security Assessment: A Task Order under Famine Early Warning System Network (FEWS NET)," unpublished paper submitted to the United States Agency for International Development/Uganda by Chemonics International Inc., Washington, DC, 2000.

reversal of many previous economic gains. Adult life expectancy has dropped 10 percent, from 47 years in 1990 to 42 in 1997. This contrasts unfavorably with life expectancies of 52 in Kenya and 60 in Ghana. There has also been a rise in crude death rates, from 8.8 to 14.4, and a slight increase in mortality of children under 5, to 170 per 1,000 children (see the The Little Data Book 2000, The World Bank).
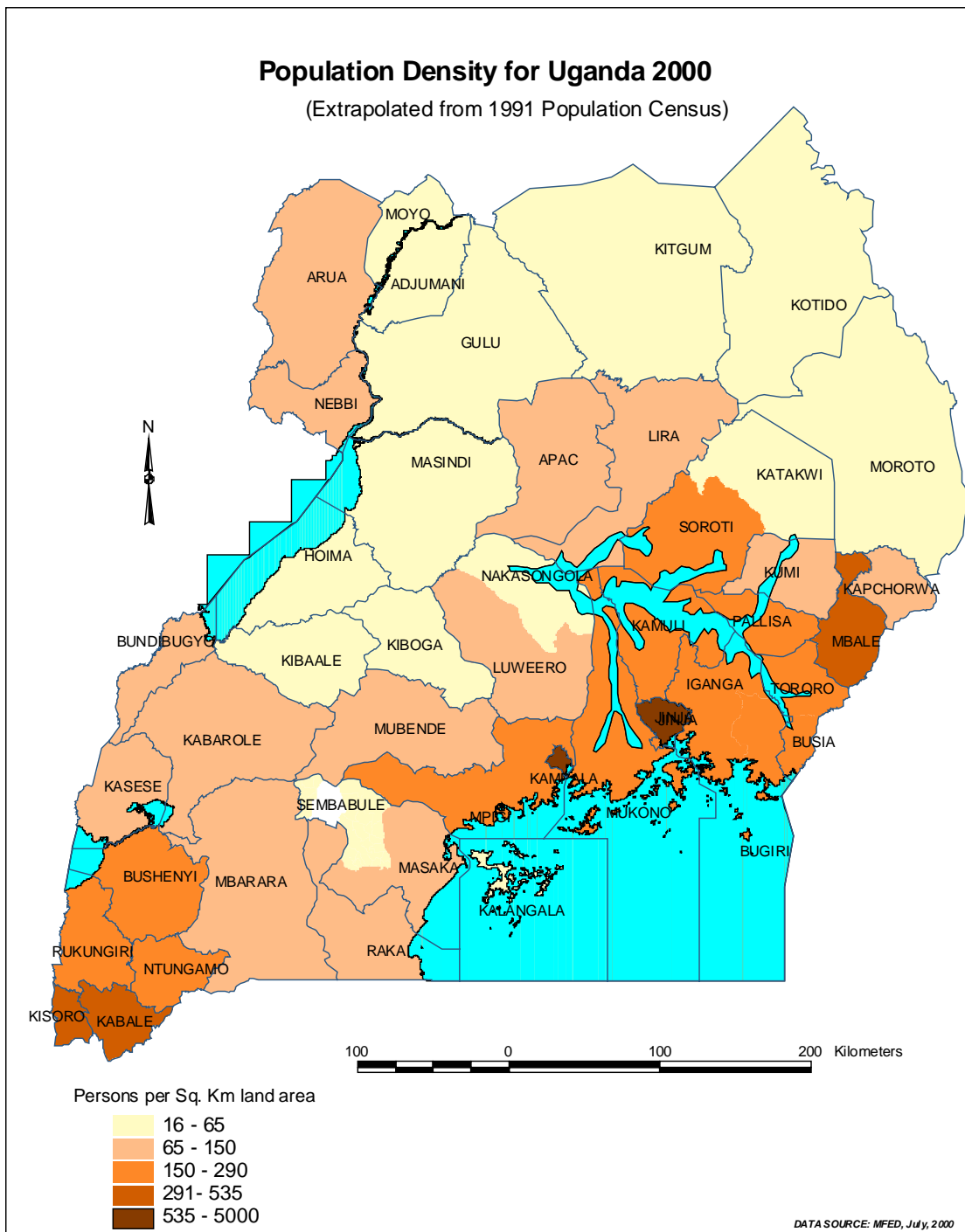
Family Size

The average rate of live births per woman (6.8) is more than one birth higher than neighbors Kenya and Tanzania. At present, only an estimated 15 percent of women use contraception, with just over half of those using modern methods. This is one of the lowest rates among 25 developing countries surveyed. The desired family size, while high at 6.5 [1989], is less than the actual size of 6.8, indicating an unmet demand for family spacing methods.

In summary, the continued high rate of population increase in Uganda places a heavy burden on economic growth, which must outpace population growth if living standards are to improve. This intensifies the challenge of keeping economic development on a sustainable footing that avoids depleting natural, social, and financial capital. A shift to smaller families would set in motion a positive reinforcing cycle of higher savings, rising living standards, and reduced environmental degradation.

Population Density for Uganda 2000

(Extrapolated from 1991 Population Census)

MOYO

ARUA

ADJUMANI

KITGUM

KOTIDO

GULU

NEBBI

MASINDI

APAC

LIRA

MOROTO

KATAKWI

HOIMA

SOROTI

NAKASONGOLA

KUMI

KAPCHORWA

KAMULI

PALLISA

MBALE

BUNDIBUGYO

KIBAALE

KIBOGA

LUWEERO

IGANGA

TORORO

KABAROLE

MUBENDE

JINJA

BUSIA

KASESE

SEMBABULE

MPIGI

KAMPALA

MUKONO

BUGIRI

MBARARA

MASAKA

BUSHENYI

KALANGALA

RUKUNGIRI

NTUNGAMO

RAKAI

KISORO

KABALE

| 100 | 0 | 100 | 200 | Kilometers |

N

Persons per Sq. Km land area

- 16 - 65
- 65 - 150
- 150 - 290
- 291- 535
- 535 - 5000

A2. Poverty

Poverty has a heavy impact on the choices available to Uganda's rural population. Both environmental degradation and declining agricultural productivity are unfortunate by-products of poverty, affecting not only economic conditions but also self-perception, especially in the willingness to take risks.
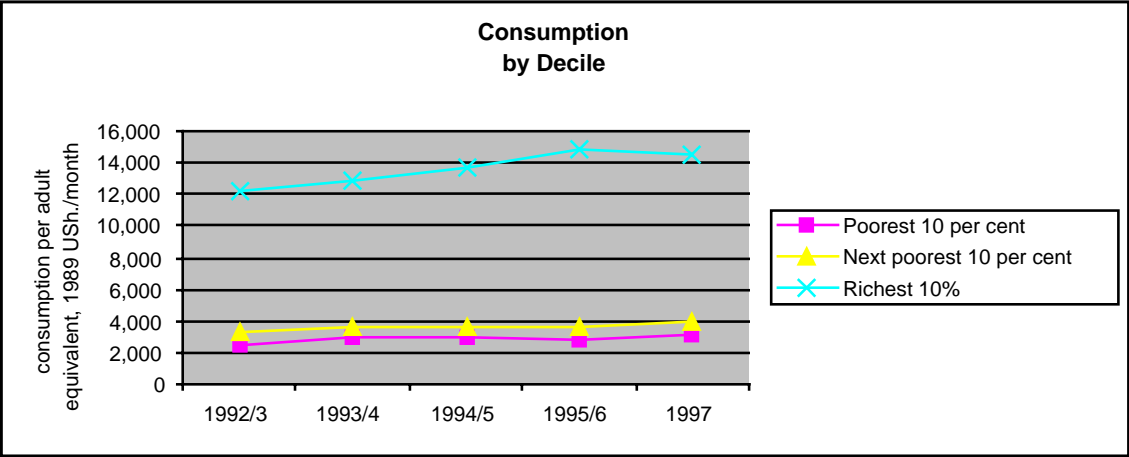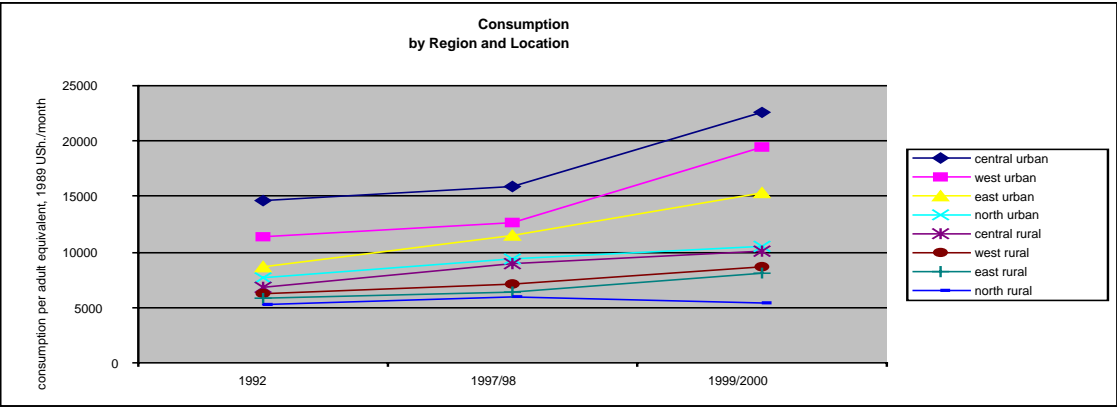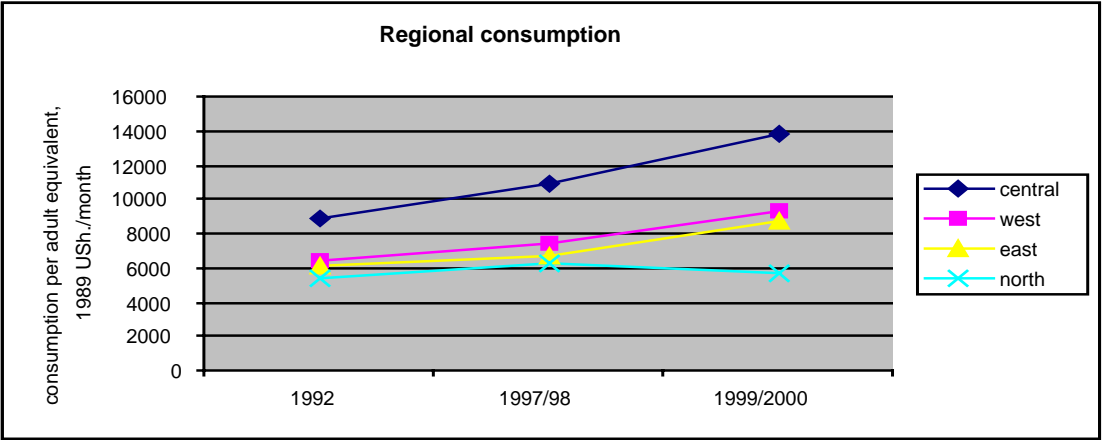
Economic growth, which has averaged approximately 6 percent per annum over the past decade, appears to have substantially reduced the proportion of Ugandans in poverty. Poverty figures declined from 56% in 1992 to 44% in 1997–98 to 35% in 1999–2000. This strong performance has been based in part on sound macro-economic management. However, as recognized by the *Uganda Poverty Status Report* (1999), poverty has been reduced unevenly. The poorest 20 percent of Ugandans have benefited the least, and both food farmers and women — who are often identical — have seen less improvement than other groups.
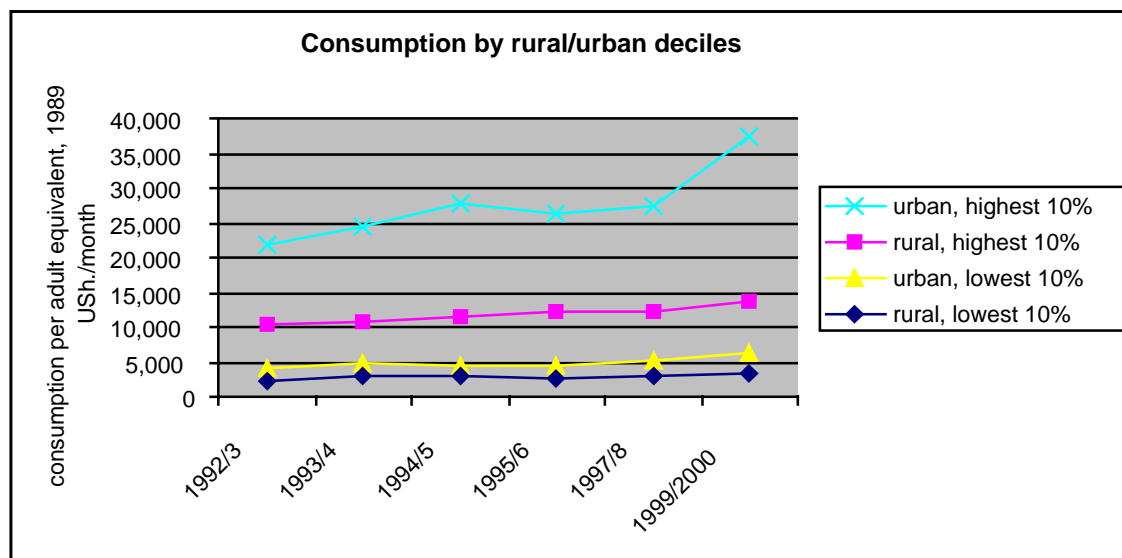
Though reductions in the household poverty rate over the last few years imply increases in social well-being, this single-dimension measure can mask a number of other dimensions of poverty (discussed later). It is based on a regional sampling methodology that may overlook finer-grained differences by region. Although this report is concerned with trends, any discussion of poverty in Uganda must keep in mind its absolute levels: In 1998 Uganda was ranked 113th in the world in consumption poverty, and 159th (out of 175 countries) by the 1998 Human Development Index. Ugandan per capita annual income is US$320, not significantly higher than it was during the decade after independence in 1962.

Since income levels in Uganda are almost impossible to determine, we have used the proxy of monthly expenditures on basic consumption goods.[3] From this viewpoint, urban households are much better off than rural ones, and the central region leads the west, east, and north, in that order. The poorest urban area (the north) is slightly better off than even the richest rural area (the central).


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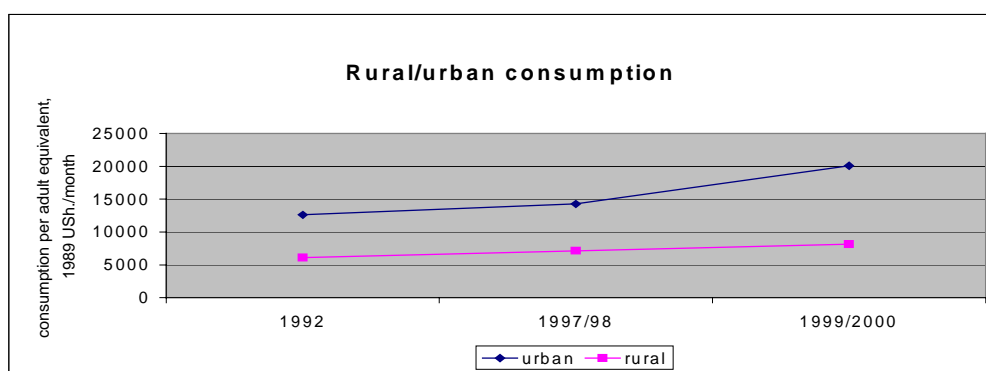
[3] This method understates the income gains made by richer people, since they do not consume all they earn but save and make investments as well. It is likely to be more accurate for the poorest 10 percent, who probably consume almost all they earn.

Regional consumption

Consumption by Region and Location

Consumption by Decile

Consumption by rural/urban deciles

Another way to look at relative poverty is to consider the number of people below the poverty line.[4] Both urban and rural poverty fell about 10 percentage points during the past two years, but the starting points were markedly dissimilar. Nationally, urban poverty fell from 17 percent to 8 percent between 1997–98 and 1999–2000, whereas rural poverty fell from 49 percent to 39 percent. By region, the drop was most pronounced in the east (from 54% to 37%) and west (from 43% to 28%). In the central region, the percent below the poverty line fell from 28 percent to 20 percent. But in the North, the already large incidence of poverty *increased,* from 62 percent to 68 percent.

Percent below poverty line
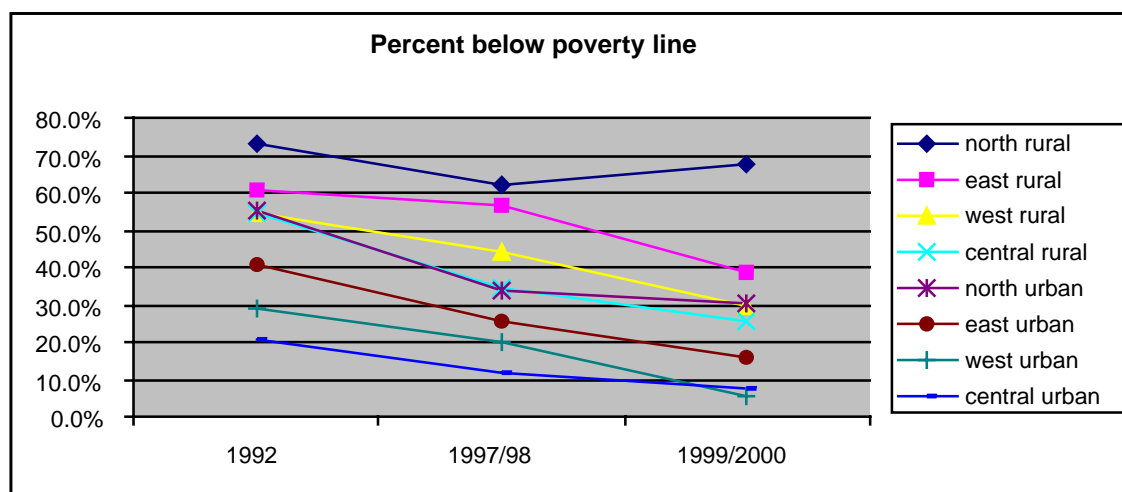
By sector, between 1995–96 and 1999–2000, households headed by a government worker (civil service, defense, education, and health) have seen the largest drop in the incidence or poverty,

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[4] The poverty line is the cost of meeting calorie needs, given the food basket of the poorest half of the population, plus some allowance for non-food needs. Since there is an unavoidable element of judgment in setting a poverty line, its numerical value is of less use than the comparisons of poverty estimates over time and by regions or groups.

from 33 percent to 17 percent. Households engaged in trade, hotels, transport and communication, other services, and construction also experienced substantial reductions of about one-third. Households in manufacturing had a smaller reduction of about one-fifth. Cash-crop farmers, those who grow coffee, saw poverty rates fall from 46 percent to 30 percent. Farmers growing other crops have seen poverty rates fall from 62 percent to 46 percent — an improvement over the previous period in which food growers did not share in the boom enjoyed by cash-crop farmers. The one group that did not enjoy a marked reduction in poverty rates were households primarily engaged in livestock and fishing, in which poverty rates are essentially unchanged at 41%.

Some of the rather remarkable reductions in rural poverty levels in the past few years cannot be explained by underlying economic performance. For instance, what has contributed to the suddenly lowered incidence of poverty among rural food-crop-producer households? Several experienced observers expressed doubts to the team about the validity of the figures.

All of these discussions depend on two related but one-dimensional definitions of poverty. The first is monthly consumption by households, which is used as a proxy for household income, as defined by head-of-household activity and denominated in cash-equivalents for household expenditure (in 1989 Uganda shillings). The second is the poverty line (see note 4). These are based on the household surveys repeated about every two years since 1992. The sampling methodology used in the household surveys (in 24 rural and 12 urban sites in 1999–2000) is not designed to tease out variations in either the causes or the effects of poverty in site-specific terms.

Any single-dimension measure can mask other dimensions of poverty. In an effort to assess dimensions not captured by statistical data, the Uganda Participatory Poverty Assessment Project, undertaken in nine districts in 1999, has discussed with the poor their well-being. Qualitative measures add the perspectives of the poor to the understanding of poverty. The results provide a clearer picture of their situation than can be demonstrated by any single indicator. Local people typically emphasize different dimensions of poverty than those traditionally used in poverty analysis; Uganda's effort to use the voices of the poor themselves to influence policy is commendable.

Local people describe poverty as lack of the means to satisfy basic material and social needs, as well as a feeling of powerlessness[5]: A poor household lacks productive assets, income, and basic necessities. A poor community lacks adequate basic services and infrastructure, has limited economic livelihood opportunities, or is affected by insecurity.

Many local people feel that poverty is worsening. The poor people consulted did not merely refer to income poverty or consumption shortfall in analyzing poverty trends. In fact, in most sites this dimension was less salient than others.[6] Although the consumption per adult equivalent (CPAE) measure includes the cash equivalent of home-grown foods, it does not appear to fully capture the experience of poverty.

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[5] Ministry of Finance, Planning and Economic Development, Uganda Participatory Poverty Assessment Report: Learning from the Poor, June 2000., p. 10A.
[6] Learning from the Poor, p. 26.

One reason for the perception that poverty appears to be worsening may be that communities think in terms of a longer time frame than statistical measures do. Communities often perceive the independence period (the 1960s) as the best time, the 1970s and early 1980s as years of strife and violence, the latter 1980s as years of hardship, and the 1990s as a time of improvement. Certainly, for those born more recently, the 1990s are indeed seen as a period of significant improvement over prior decades.

Particular groups of people paint different pictures of poverty. For example, in the refugee communities of Moyo insecurity and exile is the principal concern; in Kisoro, the problem identified is environmental decline and increasing food insecurity; in Kampala, rising demands on income due to monetization and declining access to services because service coverage is not increasing as fast as population.

Even using statistical rather than perceptual measures, some caveats are in order. Uganda's Plan for the Modernization of Agriculture (PMA) is clear in its intention to shift agricultural producers from subsistence to a market economy. This intention is laudable, given the alternatives, but the transition to monetization may cause welfare losses in the shorter run. The Participatory Poverty Assessment describes an overall impression from consultations with the poor that rising demands for cash — e.g. for health user charges (just abolished in April 2001, according to news reports), modern medication, toilets in urban areas, water, and education-related expenses, despite UPE — are outstripping cash incomes. In some districts, such as Bushenyi, there is a problem of over-marketing of food crops, resulting in higher-than-expected rates of child malnutrition.

Household gains in income terms do not necessarily translate into a gain in welfare for each member of the household. The gains from poverty reduction seem unevenly distributed between men and women. While household surveys do not collect the necessary information, enough is known to indicate a real problem.[7]

The main determinant of rural poverty reduction has been marketing of cash crops, particularly coffee. Since men tend to have authority over livestock and high-value cash crops, whereas women are responsible for food crops, these reductions in poverty may apply less to women and their children than to men. Increased marketing has also meant that food crops are getting more attention from men. The Participatory Poverty Project noted a frequent complaint by women that men used a high proportion of household income on alcohol at the expense of other necessities. In addition, the increased time women spent on raising cash rather than food crops may have decreased family welfare despite the rise in household income.[8]

A continued high percentage of children under age 5 — 38 percent in recent data — exhibit stunted growth. The western region has the highest prevalence of stunting even though it has the second highest income and the highest food production per capita of any of the four regions. This anomaly may be partly explained by the trend toward increased sale of food crops, which may have made less food available for children.

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[7] Uganda Poverty Status Report, 1999, p. 7.
[8] PMA, p. 4.

The poor often consume too little food to meet minimum nutritional requirements. While the poverty line is defined as sufficient to purchase basic foods, this statistical average may hide the actual situation for many households, who have neither the food production nor the income to access the 2,200–2,300 calories per capita needed to meet minimum nutritional requirements.

No discussion of poverty can ignore the impact of other critical trends, in particular increasing population and the declining productivity of the soils on which all agriculture depends. These essential determinants of poverty must be addressed if there is to be any long-term hope of sustainable prosperity.

A3. Declining Agricultural Productivity

Uganda, the "Pearl of Africa," is widely assumed to have good soils and plenty of land available for agricultural expansion. While that is generally true, it distorts the severity of the problem, leading to an apparent lack of urgency at all levels about addressing it.

Soil Quality

Detailed soil surveys carried out in the 1970s characterized Ugandan soils into 18 geomorphic units (groups of soils) and 138 mapping units, demonstrating a wide variation in quality. While compared to other areas in the tropics Uganda's soils are quite fertile, the soil surveys rated 27 percent of the arable land as low to negligible fertility, 47 percent medium to low, and just 26 percent as high to medium. Estimates in the 1950s had rated only 11 percent of the total area of Ugandan soils as having productivity potential of medium or higher. In either instance, it is reasonable to assume that soil quality has *not* improved since.

Using the 1994 biomass survey estimate of 8 million plus hectares of existing farmland, and adding to this a coarse estimate of another 5 million hectares of potential farmland (50% of the existing woodland, brushland, and grassland area), the distribution of productivity based on soil type suggests a total arable area of perhaps only 4–5 million hectares with high to medium potential. This is approximately the same area currently being cropped in Uganda at present. Obviously not all of the existing farmland is in the most productive areas, as these potentially more productive and fertile soils are localized and, given a choice, an individual will use the best land immediately available. It does strongly suggest, however, that the land available for expansion of agriculture may have on average less productive potential than the existing arable land.

There are indications that in certain districts, suitable land for arable expansion may already be scarce. A glance at the distribution of population densities by district and a soils map suggests that the northern areas with their inherently lower productivity have significantly less population pressure now than the more fertile mountain areas on the more productive volcanic soils, so that in the drier northern savanna areas, land availability is less of a constraint than in the wetter, formerly forested areas of the south and west.

Any consideration of land for expansion has to factor in (1) population density against the location of unused land, and (2) the potential productivity of the soils available. Although some

relocation of peoples has occurred, given the ethnic diversity of Uganda and the nature of its land tenure systems, wholesale population movements to less utilized areas are not likely, at least not in the near-to-medium term.

As population pressure moves people on to new land, perhaps into more marginal areas, and as the fallow periods inevitably shorten in areas of high population density, there is an increasing suspicion that because of the way much of the land is currently being managed, the majority of Uganda's soils cannot maintain their intrinsic fertility. For a country as dependent on agriculture as Uganda this must be examined further, as suggested in III.H (Dealing with Data Gaps).

Fertility and Yield

The fertility of Uganda's soils is directly related to their organic content. Outside the regions with nutrient-rich volcanic soils, on the predominantly ferrallitic soils in Uganda organic content is directly related to the availability of nitrogen, phosphorus and good physical structure. Work by ICRAF/AFRENA has shown that where production falls, there is a decline in soil organic content. As organic levels fall, related increases in bulk density and reduced hydraulic conductivity lead directly to diminished root growth and less soil water.

Although the Government of Uganda appears to lack specific knowledge of yield trends, anecdotal data suggests that overall agricultural productivity in Uganda is already falling, with declines in soil fertility and drops in crop yields. Within the last 10–15 years areas around the lakeshore that produced bananas seem to have replaced them with cassava. The reasons include declines in productivity caused by impoverished soils, shorter average plantation life, and an increased need for replanting in those very areas of Uganda that have a growing shortage of agricultural labor. Whatever the reasons, bananas are now being produced in intrinsically less favorable areas located away from the markets, and must be transported further to urban consumption centers.

There are clearly gaps between yields achieved at research stations and those shown by small farmers; the estimates vary from double to triple for a number of crops. Part of the yield gap is due to a lack of fertility. Nutrient balance studies conducted in eastern and central Uganda in the nineties found negative nutrient balances for all crops except bananas, where the use of mulches and manure maintain soil productivity.[9] An assessment of the fertilizer sector estimated an average national nutrient balance depletion of 86 kg/ha, mainly due to production off-takes, with smaller losses due to erosion and removal or grazing of residues. The actual depletion varied by location, with the southeast and the Kamuli/Iganga areas having rates of loss in excess of 100 kg/ha/year. An IFDC study highlighted inadequate replenishment of nutrients as a principal cause of declining soil fertility in Uganda.

Currently, inorganic fertilizer use in Uganda is limited and almost entirely confined to the estate sector. Nutrient mining — the export of nutrients from small farmers' plots by continual harvesting of food or cash crops, without a replacement system — must inevitably have a consequence. Only a small amount of artificial fertilizer is actually produced in Uganda (rock

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[9] Wortmann and Kaizzi, 1998. Nutrient balances and expected effects of alternative practices in farming systems of Uganda. Agriculture, Ecosystems & Environment, 71, 117-131.

phosphate), and given the distance from the port at Mombasa, the relative prices of fertilizer and food crops make fertilizer use unattractive in some years. FAO estimates of the incremental benefit to cost ratios for a number of crops, including maize, found that the risk of purchasing fertilizer at 1998 prices was high. A sensitivity analysis suggested that an input or output price variation of 10%–20% substantially changed the viability of fertilizer use.[10]

The pressure on the resource base is clearly increasing, particularly in the densely populated areas of Uganda. Shifting cultivation, where a community moved onto new land as the fertility of its old land declined to unacceptable levels, has practically disappeared in Uganda. Continuous cultivation of perennial crops in those areas that can support them and rotational cropping of annuals is now the norm. Experiment-station data found that yields decline by 13%–20% after only two years cropping.

Historic work on experimental farms showed that continuous arable cropping with the use of just green manure was not sufficient to maintain fertility and yields, but that a long enough grass fallow (3–4 years) could. After four years of cropping at Namulonge, organic carbon had fallen by 19,700 kg/ha and total nitrogen by 968 kg/ha. A four-year fallow period increased organic carbon by 15,950 kg/ha and total nitrogen by 769 kg/ha. At Serere, a soil fertility trial carried out over more than 30 years found that resting land for two years combined with the application of 2.5 or more tons of manure per acre maintained fertility; under continuous cropping, 10 tons of manure every three years would also maintain fertility. The main effect of the treatments seemed to have been on soil structure and phosphorus availability.

Some observations:

- Without inputs, yields must inevitably decline as overall fallow periods shorten.
- Organic matter is critical to maintaining the soil structure in Uganda.
- Adding several tons of manure at regular intervals is not an option for most farmers.
- To an individual small farmer, poor but dependable yields in six out of six years may be preferable to good yields in only three out of six.
- Putting part of the land under fallow or legume tree crops assumes that more land is available for producing food crops for home consumption. That is increasingly less true.

Continuing the current low input systems will eventually and inevitably become unsustainable with increasing population growth. The only questions are when and where. Has this already started to occur to any large extent? Or will widespread degradation of land be delayed to some indefinite future point as currently unused land comes into production? In some highly stressed locations across Uganda, land that can be cultivated in a sustainable manner is likely to disappear sooner rather than later. The alternative of widespread adoption of a high-input, high-output system is not practicable for many rural producers who have limited access to inputs and markets and because they lack household purchasing power and have limited time, labor or capital to invest.

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[10] Uganda, Soil Fertility Initiative, draft concept paper. FAO, 1999.

As the rural population expands, the most productive members have to support growing numbers of young and old — the less agriculturally productive. Some intensification will be necessary to simply maintain future options, so that if and when circumstances and technology change, there will be a base from which to grow. But the widespread adoption of any innovation depends on the farmer's perception of its utility and access to the mechanisms of change. Without that the following sobering scenario is likely to unfold.

At the national level, decline in forested areas, conversion of wetlands, and deterioration of arable land are all problems that the next generation will certainly have to find ways to address. But as long as an individual farmer has access to new land, without good land use alternatives for the existing land, expansion rather than intensification is likely. This apparently inexorable inevitable expansion is moving Uganda's growing rural population onto fallow lands, woodlands, bush, and grasslands, which in the long run can only reduce future production options and lead to a decline in yields and agro-biodiversity. The details change with the location; population pressure, land ownership, the productivity and availability of the arable land, and the amounts of land suitable for expansion in an area all interact to produce opportunities or problems.

A4. Deforestation

Uganda's forests, though still rich in terrestrial and avian biodiversity and covering a wide range of habitats, are under severe pressure and are declining in area. Uganda has lost more than half its forest cover since 1921, and the losses continue. Rapid population increases have led to a potentially unsustainable growth of demand for food, energy, and other forest-based products and services. The conversion of woodlands for agriculture and the harvesting and burning of wood products is causing significant deforestation. The result is a reduction in biodiversity and disturbances in ecosystem functioning. Given Uganda's dependence on agriculture, this continued deforestation might jeopardize future economic development.

The Resource Base

Protected forests, managed by government as forest reserves and national parks or wildlife reserves, cover about 1.4 million hectares, of which about 41 percent[11] is tropical high forest (THF). Of the total THF area, at least one-third has been degraded. About 20 percent of the Forest Reserve system is set aside for conservation in Strict Nature Reserves, 30 percent is designated as environmentally protected (allowing some low-impact uses), and the remaining 50 percent is managed for sustainable timber production. Areas protected by the Uganda Wildlife Authority are unavailable for wood harvesting. Plantation woodlots are insignificant, covering only 0.14 percent of the land.[12]

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[11] National Biomass Study, 1999; The State of the Environment, 1998, p. 71, sets the figure at 49%.
[12] Ibid., p. 20.

Table 3. Ownership and Management of Forest and Woodland (in hectares)

	Government Land Central and Local Forest Reserves (Forest Dept & Local Authority)	National Parks and Wildlife Reserves (UWA)	Total	Private Land Private and Customary Land	Total
Tropical High Forest	306,000	267,000	573,000	351,000	924,000
Woodlands	411,000	462,000	873,000	3,102,000	3,974,000
Plantations	20,000	2,000	22,000	11,000	34,000
Total Forest	737,000	731,000	1,468,000	3,464,000	4,932,000
Other cover types	414,000	1,167,000	1,581,000	13,901,000	15,482,000
Total land	**1,150,000**	**1,898,000**	**3,048,000**	**17,365,000**	**20,413,000**

Source: National Biomass Study (Forestry Department, 1999).

About half of woody biomass is outside protected areas and therefore more prone to degradation. Ungazetted THF, woodlands, and bushlands are the major sources of firewood, timber, and charcoal, and are also used for grazing and subsistence farmlands. Degradation, which tends to coincide with population density, is most serious in the eastern and central regions, less so in the western region, and negligible in the primarily grassland areas in the northern region. The central region accounts for half of all the degraded forest area.

Table 4. Deforestation in Uganda by Region

Region	Fully stocked (km^2)	Degraded (Km^2)	Percent area degraded in region	Percent of total degraded
Central	1329.3	1,427.1	52.0	50.8
Eastern	304.0	486.0	61.0	17.3
Northern	14.6	0.1	0.7	-
Western	4,390.8	894.6	20.4	31.9
Total	6,038.7	2,807.8		100.0

(**Source**: 1996 State of Environment Report, Uganda)

Timber as Energy

The major use of forest products in Uganda is for energy. Energy is not always perceived as a "natural resource," although most of the raw materials used to create it are. For this reason, energy use raises direct environmental concerns. Of the total roundwood produced in 1996–97, an estimated 95 percent was used for fuel, of which charcoal production accounted for about 16 percent.[13]

The country depends heavily on woody biomass for energy. More than 90 percent of total energy requirements are met from sources other than oil and electricity, even though electricity/hydropower continues to take up the bulk of new investments in the energy sector.

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[13] State of the Environment 1998, p.75.

Commercial usage represents less than 10 percent of consumption, and only 3 to 5 percent of the population has regular access to electricity.

The use of biomass as the energy base for Uganda has substantial economic impacts. A 1994 estimate[14] suggested that if all industries using biomass were to convert to petroleum products, the Ugandan import bill would rise by over US$ 100 million per year. If households substituted kerosene for charcoal, it would cost the country a further US$ 180 million. Converted into 2001 dollars, those costs would rise by a further 50 percent. Hydropower as an alternative energy source may not be an adequate substitute. According to the Future of the National Biomass Study (2000), even if all available hydropower potential were developed (some 2,000 mw), it would only be equivalent to about 5 percent of the current average European use on a per capita basis. The implication is that biomass energy will be the basis of energy for development in Uganda for years to come, even though the country is facing a wood crisis.

Further deforestation is therefore likely. However, information on the sustainable supply of biomass is subject to considerable debate. Most firewood and charcoal production is undertaken on non-state land. Itinerant charcoliers contract with landholders to produce charcoal as a byproduct of land clearing. Despite the large scale of the charcoal industry, which uses almost 7 million cubic meters of solid wood annually, land clearing for agriculture and grazing is occurring on such a vast scale that for every cubic meter of wood felled to produce charcoal, another two cubic meters are felled and burned on site.

It is estimated that at least 30 million cubic meters of solid wood are generated annually. A 1996 study estimated production of collected wood fuel, commercial firewood, and charcoal at 28.6 million cubic meters solid. If this is correct, supply was adequate for demand. Other estimates differ: the World Bank stated that in the late 1980s demand exceeded supply by 17 percent. However, all agree that local biomass deficits already exist, and that since demand is rising by over 3 percent per annum, more widespread deficits are inevitable. A 3 percent annual rise in demand implies that by 1998, sustainable yields should have been exceeded. The information sources available do not agree with each other; other calculations push the timeline for exceeding sustainable yields further into the future. Given the importance of this matter for Uganda's future, a more consistent and comprehensive investigation is in order (see III.H. Dealing with Data Gaps).

A rapid rise in the use of charcoal is at least partially accounted for by the 6.7 percent growth rate in urban areas. Charcoal is the energy form of choice among urban and suburban dwellers. Estimates for 2000 indicate that urban residents use charcoal for 70 percent of their cooking needs, compared to only 4 percent for rural residents. These rates were at 62 percent and 3 percent in 1993. Rising incomes almost certainly account for higher charcoal demand, although the income elasticity of demand for charcoal is not known.

Because charcoal uses significantly more wood for the same energy output as firewood (estimates for conversion efficiency vary from 10:1 to 4:1), movement of consumers from firewood to charcoal increases the pressure on the wood resources of the country. Incentives for energy conservation are poor, as over the last few years the price of charcoal has dropped

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[14] Uganda Woody Biomass Study, 1996.

relative to the price of any other household commodity including *matooke* (the staple cooking banana).[15]

This study has undertaken construction of a simple model for demand of fuelwood over the next 25 years. Although the model is sensitive to assumptions about the income elasticity of demand, the conservative projection is that *demand will at least triple by 2025*. While plantation area is expanding in some areas (for example, it has doubled in Kabale since the 1960s), this is a tiny part of biomass supply. Most plantations service the tea and tobacco industries. The increased demand for wood will increase pressure on Uganda's forests. Recent news reports of wood fuel scarcity indicate that in Mpigi District, large deforested areas of land are giving way to savanna vegetation; in Luwero District, even hedges planted around homes are stolen for fuel; and in Kampala, timber scaffolding is being stolen from building sites (New Vision, April 9, 2001). Frequent and prolonged droughts are blamed on the drastic reduction in tree cover in Nakasongola District, a source of charcoal for Kampala for two decades.

Carbon Sequestration

Besides providing almost all the country's energy and meeting a large demand for other raw materials, the forests and wooded lands of Uganda have other vital functions. These are becoming increasingly threatened as local harvests exceed the renewable supply.

The data about the economic value of Uganda's forests for non-wood uses are largely inadequate. One area in which estimates have been made is for carbon sequestration. This can be estimated either as the damage avoided by preventing conversion to other uses (with a consequent release of carbon into the atmosphere) or as the cost per ton of carbon sequestered through forestation programs. Using above ground biomass estimates produced by the National Biomass Study, Howard estimates that conversion of intact tropical high forest to small-holder agriculture carries a reduction of 70 tons dry matter biomass per hectare, equivalent to 35 tons of carbon. Conversion of woodland to grazing land carries a reduction of 34 tons dry matter biomass per hectare, equivalent to 17 tons of carbon. If the higher end of the internationally accepted shadow price of carbon is used (US$6–$10), and if it is assumed that 700,000 ha of the protected area total is intact high forest and 2.5 million ha is woodland, then the carbon sequestered by the protected area estate is worth US$245 million. Using a 5 percent discount rate, over a 25-year period this is equivalent to an annual cash flow of US$17 million.

Reforestation schemes undertaken on formerly encroached parts of Mt. Elgon and Kibale National Parks report costs of $0.30 per ton of carbon removed from the atmosphere (compared to $6.70 per ton in Holland). Using this figure, the estimated 67.7 million tons of carbon sequestered in Uganda's protected areas — above the level likely under alternative land use scenarios — is worth US$ 20.3 million. Unfortunately, until an international system for capturing and paying for such benefits is implemented, these assets will remain potential.

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[15] The team encountered one brick-maker 20 miles from Kampala who said he had paid a total of 17,000Ush ($10) for a load of firewood from a source 50km distant. It underscores the point that, despite national shortages, the resource itself is seen as free, or practically so.

Howard also points out that the genetic option value of the wild coffee found in protected areas could be worth US$1.5 million annually, in addition to a further US$0.8 million in potential pharmaceutical options.

Ecosystem Functions of Forests

No complete recent study has been done, but a review based on international values gives a substantial bottom-line (see table 5) to the ecosystem functions supported by forests (soil fertility, hydrological cycle, carbon cycle/sequestration rates, and biodiversity).

Table 5. Value of Rainforest (2000)

Item	US$/ha/year
Direct Values	
Food, raw materials	465
Genetic resources	54
Recreation	150
Subtotal	615
Indirect Values	
Disturbance regulation	6
Water regulation	8
Water supply	10
Erosion control	328
Soil formation	13
Nutrient cycling	1,235
Waste treatment	116
Subtotal	1,716
TOTAL	**2,331**

Source: Ruitenbeek, notes; after Costanza et al. 1994 US$, adjusted to 2000.

Using this value and a number of crude simplifying assumptions,[16] the international annual value of Uganda's protected tropical high forest is US$573 million. This value may not be sufficiently rigorous to use in policy analysis, but it does suggest the substantial size of the ecosystem values that may otherwise be overlooked.

Placing the ecological values of forest and the immediate economic returns of biomass in relationship to each other clarifies the policy dilemma. Although the protected forest that sustains much of the ecological value is different from the wooded areas under the greatest deforestation pressure from regular harvesting, not enough is known about the demand and supply of either ecological or economic uses to be sure whether or not the point of non-sustainable extraction is fast approaching or has in fact already been passed. Ensuring sustainable use of natural forest resources is a challenge that requires immediate attention.

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[16] Assume that 20 percent of tropical high forests in Forest Reserves is available, since the rest is subject to low-impact use and to harvesting; assume that one-third of tropical high forest is degraded (Biomass Study); and assume, arbitrarily but conservatively, that degraded THF is worth one-quarter of the international value.

A5. Declining Biodiversity and Agro-Biodiversity

Biodiversity is the measure of *variability* within an ecosystem. Variability is a major determinant of ecosystem resilience — of its ability to adapt to changes in the environment. Applied often to wild flora and fauna, biodiversity also has relevance for agricultural systems. In the last 30 years, the trend in biodiversity and agro-biodiversity throughout Uganda has been toward smaller populations and some loss of species. More intensive agriculture and grazing has deprived many plant and animal species of their habitats even while uniform commercial plant varieties supplant varieties of more traditional farming crops.

This trend in biodiversity, documented by Makerere University[17] and the GOU upon its accession to the Convention on Biodiversity,[18] is due to a number of causes, generally linked to population increase. Hunting and collecting of wild animals and plants is a major cause of species and population reductions. The most publicly recognized loss, through unrestricted poaching, was of both the black and the white rhinoceros, which are no longer found in the wild in Uganda.

Encroachment into protected areas and conversion of land from less to more intense use has removed a great deal of habitat for plants and animals. By some estimates, only one-fifth of the forest cover, including savanna woodland, remains from what was found in 1891. By a narrower measure, forest cover has declined at an accelerated pace, from almost 14 percent of the country in 1900 to about 3.6 percent in 2000, a loss of more than 80 percent. In addition, changing agricultural practices are causing the disappearance of indigenous food species, especially vegetable varieties not known globally. The introduction of alien species is not an abstract threat, as the decimation of the cichlid population of Lake Victoria through the introduction of the Nile perch readily demonstrates.

The Forestry Department Biomass Survey shows a rapid decline in tree cover in some areas; selective harvesting of trees threatens the natural regeneration of valuable hardwood species. Discussions with forestry officials disclosed a related and more insidious concern, the loss of the better genetic material provided by mature trees. Selective logging has set in motion a counter-Darwinian process: With the removal of "the best and the brightest" of the trees, the overall quality of the forest enters a cycle of decline because only secondary quality stock is left to regenerate the next generation. Any further cutting tends to remove the best of what is left, ensuring that trees with the least favorable characteristics gradually gain ascendancy. Because the effects are localized, it is not clear how this affects animal populations, although the effects are unlikely to be beneficial.

Animal populations, avian and mammal, reptile and rodent, have declined over the last 30 years. There is some hope that, if protected, many can return to an acceptable breeding population. Others may have no hope of avoiding extinction without very direct intervention. Prospects for this, however, are not optimistic. Since a loss of species almost always follows a loss of habitat,

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[17] Arinaitwe, Harriet, Pomeroy, Derek, and Tushabe, Herbert, *The State of Uganda's Biodiversity 2000*, National Biodiversity Data Bank, Makere University Institute of Environment and Natural Resources, March 2000.
[18] Government of Uganda, *First National Report on the Conservation of Biodiversity*, January 1998

continuing deforestation, even in forest reserves, does not bode well for species that are not located in more protected national parks.

Detailed data on trends in species populations by district and region is not yet available. Fran Michelmore has put together a table for the Uganda Wildlife Authority (reproduced in Arinaitwe, note 18), estimating trends for large mammals. The decline in mammal populations has been indiscriminate, although some of the more charismatic animals have been entirely wiped out, such as the rhinoceros. The reduction of the great apes to a handful of individuals, with fewer than 300 mountain gorillas remaining, is a well-known story. Similar reductions in pelicans, fish eagles and many other bird species are on record. The viability of the many reduced bird populations is unknown. The effect of such continuing losses on prospects for reviving wildlife tourism is understandably cloudy.

Table 6 summarizes the reduction and loss of selected large mammals on which data are available and illustrates the more general loss of biodiversity across species, fauna or flora.

Table 6. Estimates for Populations of Large Mammals in Uganda

	1960s	1982–1983	1995–1998	Present status in Uganda
Antelopes				
Hartebeest	25,000	18,000	2,600	Population decreasing
Topi	15,000	6,000	600	Population decreasing
Impala	12,000	12,000	4,000	Population decreasing
Waterbuck	10,000	8,000	3,500	Stable
Uganda kob	70,000	40,000	30,000	Population stable
Bright's gazelle	1,800	1,400	100	Precarious
Roan antelope	700	300	8	Very rare, precarious
Oryx	2,000	200	0	Extirpated
Eland	4,500	1,500	500	Population decreasing
Darby's eland	300	?	0	Extirpated
	+/- 141,300	+/- 87,400	+/- 41,300	
Decline		38%	53%	
No. of species	10	9	8	
Other Large Mammals				
Elephant	25,000	2,000	1,900	Population low but stable
Black rhino	400	150?	0	Extirpated
White rhino	200	20?	0	Extirpated
Hippopotamus	26,000	13,000	4,000	Population stable
Rothschild's giraffe	2,500	350	200	Low but stable
Buffalo	60,000	25,000	18,000	Population stable
	+/-141,000	+/- 40,500	+/- 24,100	
Decline		65%	40%	
No. of species	6	6	4	

Source: Compiled for UWA by Fran Michelmore, quoted in Arinaitwe et al.

This section should be read in conjunction with the report Chemonics is preparing that analyzes the current status of Uganda's biodiversity and tropical forests.

A6. Degradation of Wetlands and Fisheries

Water comprises roughly 17 percent of Uganda's territory. A surprisingly large amount (one-eighth of its area, or 29,000 km^2) is accounted for by wetlands, a total twice the size of the gazetted forest area. Indeed, Uganda contains fully 8 percent of Africa's wetland resources. Wetlands significantly affect the national economy, in terms of support both for direct livelihoods and for necessary ecological functions, such as provision of water, wastewater treatment, maintenance of hydrological cycles, and prevention of storm damage and erosion.

CONSERVATION AND DEVELOPMENT: A POLICY DILEMMA.

SOME NATURAL RESOURCE INVESTMENT CHOICES MAY AFFECT THE DIRECTION AND MAGNITUDE OF ECONOMIC GROWTH. THE GOU HAS TO BASE PART OF ITS INVESTMENT ANALYSIS ON THE NET PRESENT VALUE OF CURRENTLY DEGRADED, BUT RENEWABLE RESOURCES

In its support to conservation, and especially to the protected areas, the GOU faces difficult choices. The revenue problems of UWA illustrate the perplexing nature of justifying conservation and biodiversity initiatives in a poor country where trade-offs are unclear and benefits seem distant. The low populations of animals and continuing insecurity around the protected areas together deprive UWA of the tourism-related receipts it needs to become independent. Only about a quarter of its receipts result from tourism; the rest comes from GOU subventions and help from multilateral and bilateral donors and NGOs.

Uganda's parks were once among the most attractive in Africa, but they have lost some of the species and most of the animal populations that made them popular. The slow natural process of regenerating animal numbers will continue to limit tourism interest in the short run, even if security problems are overcome. With time and peace, the allure of the stunning combination of lakes, rivers, mountains, wildlife, and vegetation found especially in central and western Uganda will again attract tourists to the parks. There is scope for growth in tourism, since the other ecotourism destinations in Africa cannot indefinitely absorb the large numbers of interested travelers visiting these sometimes fragile ecosystems.

The viability of UWA as a conservation institution ties in closely with the tourism value of its assets, which are currently quite low. Further, while land in parks is land that may be desired by surrounding communities, it is not possible yet to compensate them for the opportunities they forgo by not using park land for alternative uses like farming. Yet the revenue earning potential of the assets dwarfs the likely return to subsistence land uses. Tourism is a significant revenue earner for Uganda, with great potential over the medium and long term, but only if Uganda's protected areas are well managed. The future contribution of tourism is only sustainable if the communities surrounding the protected areas recognize their value and gain real rewards for supporting them — soon. Both good management and positive community interest are current imperatives in letting the value of the assets grow. Development of a tourism service sector might absorb an increasingly educated population in new jobs, earn foreign exchange, and become a major engine of development.

A recent study of wetlands in the Lake Victoria area estimated their value at roughly US$74 per hectare. That figure is based on values assigned for growing crops; harvesting papyrus, poles, and wood; brick-making; domestic water; wastewater treatment; and fish reproduction. Applying that figure to all Uganda's wetlands gives an approximate value of 380 billion USh, or approximately US$220 million. This value is conservative, since it does not include such ecological functions as storm abatement, erosion control, support for biodiversity, and natural resource production. Since wetland uses and values would vary across the country, this order-of-magnitude estimate helps simply to indicate the sizable contribution made by wetlands to the well-being of Ugandans, especially poorer Ugandans.

Wetlands are most valuable as a source of natural drinking water and the flushing of wastes. For example, Kampala depends on the wastewater treatment capacity of Nakivubo wetland, which treats industrial wastes and sewage for 40 percent of the city's people. Nakivubo was valued in 1999 at between US$1.03 to $1.44 million annually. One estimate puts the water treatment values of wetlands at US$25 million per year for the country.

While wetlands are a useful resource for agriculture and livestock production, caution is needed in using wetlands to generate income. Generally, wetland hydrological services are considerably more valuable than direct production would be. If wetland conversion damages hydrological function, the gain to agriculture and livestock production is likely to be far less than the cost to society generally of improving water quality, quantity, and distribution.

Loss of wetland hydrological services is felt over a wide area, with potentially severe impacts on downstream users from flooding and other flow impacts, along with other changes in ecosystem functioning. For example, rice cultivation creates infiltration into subsurface aquifers, which raises the water table and tends to cause brackish water to rise in areas around rice fields.

Loss of wetlands can also result in micro-climate changes: "In some parts of Bushenyi and Kumi districts, it is felt that extensive reclamation of swamps has contributed to the reduction in rainfall amounts and adverse changes in rainfall patterns."[19] Benefits of conversion may be limited, since drained wetlands rapidly lose their initial fertility. In addition, the benefits of conversion often accrue to only a few users; many users, particularly the poor, may lose access to numerous and affordable natural wetlands products.

Although the National Environment Statute (1995) protects wetlands, they continue to be converted or degraded. Anecdotal reports indicate considerable concern about loss of wetlands; for example, *New Vision* (March 6, 2001) reports that "many" have disappeared within a short period without any action being taken against the developers. Data about the rate of conversion are difficult to obtain, although Phase II of the National Biomass Study provides a snapshot of current conversion levels by district. Some districts have lost considerable portions of their wetland areas. Permanent wetlands do not appear to be under heavy pressure except in specific areas of high population density: While only four districts have lost more than 3 percent of their permanent wetlands, Kabale has lost 28 percent, and Kisoro 54 percent.

Seasonal wetlands are under much heavier and more widespread pressure. The survey found that 10 districts have lost between 2 percent and 10 percent of their wetlands, 3 between 20 percent and 40 percent, and the remaining 8 between 40 percent and 92 percent, with Kisoro once again at the top of the list and Jinja and Kabale not far behind. An estimate for the area of new lands brought into agricultural production since 1980 is roughly 24,000 km^2, about 20 percent of which has been converted from wetlands. If the lost 4,753 km^2 are valued at the wetland value of US$74/ha, the gross annual conversion loss would be US$35 million (not accounting for income produced by the converted land).

Note that these numbers refer to wetland areas actually converted. No data are available on the number of hectares where there has been some partial conversion. Nor is there a detailed understanding of the critical thresholds that allow a wetland to maintain its hydrological functions while also being used for other purposes. Partial conversion is often possible without damaging wetland functioning, and in many cases mixed use may be an appropriate strategy.

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[19] Zake, Julius Y. K., M.K. Magunda and Charles Nkwiine "Integrated Soil Management for Sustainable Agriculture and Food Security: The Ugandan Case" unpublished paper presented to and sponsored by FAO workshop on "Integrated Soil Management for Sustainable Agriculture and Food Security in Southern and East Africa" Harare, Zimbabwe, 8-12 December, 1997.

While more attention has been paid to wetlands in the last few years, with the National Wetlands program beginning in 1989 and the National Wetlands Policy approved in 1995, information on wetland functioning is still inadequate. For example, no hydrogeological mapping has been done since 1964. Wetlands globally are the most productive ecosystem next to tropical rainforests for carbon sequestration and when managed as carbon sinks can be a buffer against climate change.

Fisheries Resources

Fish meets a high proportion of the country's protein needs. The fisheries sector makes a significant contribution to GDP and generates substantial income for an estimated 400,000 Ugandans engaged in fish harvesting, processing, distribution, and marketing. The significance of the income derived from this industry is heightened because the fishing trade and market operates year-round. Income generated by the sale of fish and fish products is largely provided by *Lates niloticus,* Nile perch, 46.5 percent of the catch, and *Oreochromis niloticus,* tilapia, 39.3 percent. Lakes Victoria and Kyoga provide the bulk of the catch.

Most fish are consumed domestically, but fish sold primarily to EU markets have become a key export commodity. From a very limited beginning in the early 1990s, exports have grown to total US$30–$45 million over the past six years, making fish the second largest commodity export earner behind coffee — despite an EU ban on exports from Lake Victoria because of the use of pesticides and their improper handling in the countries sharing the lake.

National fish catch has changed substantially since 1963, when the recorded base catch was 64,000 tons. Recent catches are in the range of 200,000 to 230,000 tons. However, no estimates of carrying capacity have been carried out, so catch levels cannot be compared with potential sustainable yields. Ministry of Planning figures on fish catch are so straight-line as to make them highly suspect. Furthermore, fish are easily transferable, so that fish caught on Lake Victoria in Uganda and exported through Kenya or Tanzania may never show up in the records.

Overall, catch levels have been increasing, despite destructive water hyacinth weeds on Lake Victoria. The water hyacinth population has been constrained the past two years by the effects of El Nino and by USAID-supported control measures (specifically, two species of weevils).

Although the trend has been a rise in volume of fish caught, two disturbing signs are now evident:

1. Nile perch have driven out a number of original species, making the increasingly single-species fish population more susceptible to disease.
2. There is both a noticeable male-bias and a decrease in size of the Nile perch population in Lake Victoria. Overharvesting of females and immatures may mean that the Nile perch may not be capable of sustaining the current high yields.

The situation is disturbingly similar to the trends for the natural resources already discussed — increasing pressure of population and the drive for increased exports may be forcing the resource to produce at levels that are not sustainable.

A7. Land Tenure

Uganda is a country of rural cultivators, practicing different types of subsistence agriculture on small plots. Cash crops are of secondary importance to food production. Most rural Ugandans exist on the margins of the cash economy, putting their primary efforts into producing food or livestock for their subsistence. Such resource-poor, mainly illiterate, impoverished peasants make up the majority of rural dwellers — about 70 percent of all farmers nationally.

Social and cultural factors such as the inheritance system, settlement patterns, and land tenure affect access to land for the expanding population. As land is subdivided through inheritance, there appear to be increasing numbers of smaller and smaller plots. Primary commercial farmers are a definite minority (an estimated 5% of the total), with semicommercial farmers accounting for 25 percent. The Plan for Modernization of Agriculture seeks to change these proportions significantly by focusing on opportunities for farmers to move into commercial cultivation.

Access to land resources has been contentious for Uganda's governments for more than 100 years; private ownership of land in the Western sense is the exception rather than the rule. In Uganda there are now four broad categories of land: registered freehold, *mailo*, customary, and land held by the state, which includes the national parks and forest reserves. Only a small portion of agricultural and pastoral land has ever been under freehold tenure, with most under either mailo or customary tenure.

Mailo is a form of private land holding based on distribution of large tracts of land to a few influential people in the early days of the Uganda Protectorate. The landlord-tenant relationship established then is still significant. Precise figures on its extension are not available, but it appears that about one third of land units are in mailo holdings, making up more than 40 percent of total land.[20]

Governments have modified the rights and duties of mailo owners and their tenants a number of times since, with growing dissatisfaction on the part of both groups. Owners are not motivated to invest in the land and tend to treat it as a source of wealth but not of production, whereas tenants with limited rights have therefore limited interest in improvement.

Mailo and its related categories, such as kibanja, are not found uniformly across Uganda. The largest portion is the 9,003 square miles originally given to the Buganda.

Customary tenure varies from region to region but generally defines access in terms of the rights of the individual, the family, the clan, and the community. Tenants on mailo holdings cannot, and, until the Land Act of 1998, farmers with customary rights could not use land as collateral for agricultural loans.

With both systems, security of access is a major determinant of the willingness of individuals to invest in land.

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[20] Reliable data on land tenure types by district or region are not available. Studies indicate considerable variation from district to district, or even parish to parish. The extent of mailo holding clearly affects the potential for modernizing agriculture because so much of it is managed under tenancy arrangements. Fragmentation due to inheritance has, moreover, reduced most holdings to modest sizes.

Registered freeholds cover only a small part of Uganda. Much of the land in the north and east was held under some form of customary tenure, with various use rights. As the communal and mailo systems evolve, most, if not all, Ugandans would regard their rights under these systems as equivalent to a right of continued use, even if there is no formal title. In areas where population pressure has been highest, appropriation of prime communal resources by individuals and land registration appears to have been occurring much faster than in less stressed areas.

There is little information available on average parcel size for various forms of land tenure. Since freehold land is far less significant than mailo (actually a variant of freehold) and customary tenure, successful commercial farming is more likely to be undertaken by mailo holders. People on customary holdings seem to have access to less land. Thus, farmers with mailo and freehold land are more likely to be commercial or semicommercial farmers. Trout,[21] in her research in four subcounties in the central region, found that households with access to larger holdings are very likely to be more commercial. Table 7 represents the size of holdings by tenure access and whether or not the tenure (not necessarily the land) was purchased. Although there is considerable variation, customary landholders and mailo tenants tend to have the least land.

These findings suggest that poverty reduction through commercialization of small holdings should be undertaken with caution. Commercial enterprise is likely to benefit the larger landholders without affecting those with very small land parcels, who are presumably the poorer members of the community. An active land market and financial arrangements allowing land-poor but progressive individuals to enter commercial agriculture through land purchases might ameliorate the situation. Large-scale commercialization of small holdings may demand entirely new technologies and markets or significant migration by small holders to nonfarm locations.

**Table 7. Number and Weighted Average Size of Permanent Tenure Parcels
in Central Region**
(By subcounty and whether the land was purchased)

	Average parcel size (acres)			
Sub-county and tenure	**Not purchased**		**Purchased**	
	#	**Ave. size**	**#**	**Ave. size**
Kibinge	152	3.4	51	2.2
Busaana	78	3.0	44	1.8
Kabulasoke	89	3.7	44	2.7
Bukuya	124	7.9	28	7.0
Kibinge mailo land	58	10.3	11	4.5
Mailo tenancy	92	2.3	36	1.9
Customary tenancy	2	6.5	4	5.5
Busanaa mailo land	23	9.4	2	13.0
Mailo tenancy	18	1.7	5	1.2
Customary tenancy	37	2.4	37	1.7
Kabulasoke mailo land	30	10.2	10	9.4

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[21] Troutt, Elizabeth S., *Rural African Land Markets and access to Agricultural Land: The Central Region of Uganda*, Ph.D. thesis, Department of Agricultural Economics, University of Wisconsin, Madison, 1994

Mailo tenancy	48	2.7	32	2.1
Customary tenancy	11	1.3	2	0.8
Bukuya mailo land	46	35.2	10	15.9
Mailo tenancy	71	3.5	17	5.4
Customary tenancy	7	6.2	1	2.0

In assessing the implementation of the Land Act, a report by Makerere University discusses a limited sample of 576 from selected villages in 8 districts[22] of four regions. Although the figures are not based on a random sample, they broadly indicate the status of land tenure arrangements in the regions. The distribution of customary, mailo/freehold/leasehold, titled, and rented/borrowed land, as well as land for which the tenure regime was not known by the resident is computed for the four regions in Table 8.

Table 8. Proportion of Tenure Types by Region (adapted)
(percentage of sample total within the region)

Type of tenure	Central	West	East	North	All regions
Customary	38	79	55	72	63
Kibanja on Mailo/freehold/leasehold)	32	9	8	16	16
Titled	4	1	11	1	3
Rented or borrowed	10	4	2	11	7
Don't know	16	7	24	-	11

The importance of customary tenure all over Uganda is clear, as is its special significance for the western and northern regions. Mailo land is especially important in the old Buganda Kingdom.

The challenge to Uganda is to make the land more productive. This is underscored by the large amount of land that is other than titled. In the study, male heads of household own more than half of the land, although women do own about 20 percent. Much of the discussion over tenure focuses on the incentive to the farmer. Where access rights are insecure, or where operators cannot sell or mortgage land, they are unlikely to adopt techniques to improve productivity.

The same study reveals that while the average farm size nationally is just over 13 acres, half the households sampled have less than 2.5 acres. Variation by region for the bottom median is between 2 and 3 acres per household. Obviously, those households are highly likely to be poor. The poor have limited access to resources and less opportunity to act on alternatives to increase income. Additionally, those who farm relatively little land rely on other income strategies for subsistence, including petty trading and daily wage labor. Expansion of commercial farming opportunities might draw small holders into wage labor, especially considering how labor-intensive some cash crops are.

Improving the range of effective adaptive strategies of the poor is one way to alleviate poverty; thus, a program for helping small farmers improve their production **and** gain access to greater wage labor opportunities might be an effective short-term response to rural poverty.

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[22] Makerere Institute of Social Research, *Land Act Monitoring Exercise 1: Report* for Department for International Development, and Ministry of Water, Lands and Environment, Makerere University, November 2000

Analysts have proposed revision of the land laws to establish a uniform freehold system. This is very difficult and subject to strong opposition by powerful parties. Strengthening a land market dealing in freehold title is an objective of various land reform proposals intended to boost access rights and incentives. Of immediate and practical importance is the GOU policy under the PMA to formulate a land use policy and implement the Land Act of 1998.

The PMA and the Land Act anticipated implementation of a land fund to compensate people evicted from government land, enable others to register land, enable tenants on mailo land to buy out the owners, and enable the poor to buy land. The dimensions and costs of the program are under review, as are the costs of instituting land boards. Land boards were set up in all districts, but were not adequately funded. This resulted in a land registration and dispute resolution system less efficient than the one it replaced. Both the Land Act and land use policies are likely to be revised.

Interestingly, the Land Act of 1998 attempts to make it possible to alienate customary land that is not specifically restricted from alienation. It is the clear and stated intent of the law to make such land subject to mortgage as a basis for increased commercial production.

Any discussion of access rights to land and the desirability of increased agricultural production must take into account the overwhelming significance of women in the agricultural system.[23] Women do a great deal of the agricultural work, especially amongst the subsistence poor. The benefits of their labor, especially of cash crops, can be appropriated by men or by families according to customary rules, although attitudes toward women's rights are rapidly evolving toward greater and more secure rights to products and land. The effort to bring the poor into commercial farming will have to recognize the role of women in agriculture and the need for them to gain greater rewards for their labor; that appears to be happening at the policy level with the PMA. Continued evolution of land law and land use policy, effective inclusion of women, and improved ability by women to inherit land or maintain use rights will be important elements in modernizing agriculture.

Access to resources has overwhelming significance for increased productivity and the distribution of income benefits. The GOU is attempting to address land access questions, but little reliable information is available for planning purposes. A new land use policy should be formulated based on understanding of existing relationships and the extent of area covered by each. Participatory rural appraisal research on limited and opportunistic samples is not a replacement for a reliable random sample of land use and tenure, especially not for district and regional planning.

B. The Policy Context

The GOU's most prominent recent policy thrust has been the Poverty Eradication Action Plan (PEAP) of 1997 (revised July 2000), the umbrella plan for a host of detailed agency plans, strategies, and policies now in various stages of formulation. The PEAP manifestly does not

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[23] See: Sebina-Zziwa, *Gender Perspectives on Land Ownership and Inheritance in Uganda*, Makerere Institute of Social Research and the Land Tenure Center, University of Wisconsin.

contain, though it implies, sustainable resource use, despite the assertion of the 1995 National Environment Management Policy of the need to "integrate environmental concerns in all development policies, plans and activities at national, district, and local levels." This lack of focus is being rectified in of an environmental sector program being created by the National Environment Management Authority (NEMA). It is closely related to the agricultural sector plan, the Plan for the Modernization of Agriculture, which singles out "sustainable natural resource utilization and management" as a core concern.

The other major policy initiative to which all agencies must respond is the far-reaching Decentralization Act of 1997. District and subcounty operational plans are to be the basis for activities funded through grants consistent with broader policy and regulatory determinations of the central government. Major issues under discussion within the GOU are the implementation of the Land Act (1998) and creation of a coherent land use policy.

B1. Cross-Sectoral Coordination

The National Environment Management Authority (NEMA) oversees the National Environment Management Policy (1994) and coordinates implementation of the National Environment Action Plan (NEAP, 1995). Based on the NEAP, NEMA is expected to encourage, supervise, monitor, and coordinate environmental actions across sectors, and provide technical and training input and policy assistance to other agencies. It is not an implementation arm of government. NEMA will publish an environment sector action plan after major sectoral pieces like the PMA, the forestry sector plan and forestry policy due to be published in 2001, and the 10-year Wetlands Strategic Plan (2000) are all in place. NEMA's somewhat belated but extraordinary efforts to "mainstream" environment into poverty eradication planning are now evident. NEMA has recently joined the PMA policy level steering committee at the Permanent Secretary level, and a Task Force on Environment and Natural Resources has been established. As an agency supported almost entirely by donor funds, NEMA has yet to establish its authority, credibility, and usefulness within the GOU.

B2. Forests

A new National Forestry Authority (NFA) will soon replace the Forest Department housed within the Ministry of Lands, Water and Environment. The NFA is a vitally important departure from normal public sector forestry management because, according to current plans; it will become largely self-supporting through management of forests and fees for its services. Consistent with establishment of the new authority, which will have broad representation from stakeholders, a new forestry policy (to be published) will maintain a conservation role for the new NFA but encourage management responsibility in various groups through consultative planning and management, encouragement to nongovernmental and community-based organizations (NGOs and CBOs), and multiple use strategies. The old policy of government retaining ownership of natural resources on private and customary land is thrown out and landowners become owners of the natural resources on their land. Mailo and customary landholders can hold forestry reserves (plantations).

While the new policy advocates forest use consistent with conservation of biodiversity and existing ecosystems, it also favors sustainable use of forestry resources on private land to further

eradication of poverty and economic growth. It is the clear intention of government to support private sector development of plantations. Quite possibly, international carbon credits will become available to fund a significant amount of plantation forestry in Uganda, with some potential benefits in terms of soil and water retention and the wood products industry.

B3. National Parks and Reserves

National parks and wildlife management fall under the autonomous Uganda Wildlife Authority (UWA). UWA holds a strong mandate from government through the Wildlife Policy and Wildlife Statute (1996) to preserve and manage biodiversity and cultural and historical assets in protected areas while maintaining a commitment to partnership with neighboring communities. As the projected National Forest Authority, UWA is to become independent of government contributions and to be self-supporting, largely through tourism revenues. The current security system makes that goal difficult to achieve. In the medium term, once immediate difficulties are resolved and management of forests and parks has attained some stability, responsibility for wildlife, forests, and protected areas will be unified in one agency.

B4. Wetlands

The National Policy for the Conservation and Management of Wetland Resources (1995) is administered by the Wetlands Inspection Division of the Ministry of Water, Lands and Environment. The Wetland Sector Strategic Plan (WSSP) for 2001–2010 integrates closely with the Poverty Eradication Action Plan through attention to increasing income and quality of life of the poor.

B5. Land

Agricultural development policy sets out to eradicate poverty through a comprehensive and detailed PMA. Subsistence farmers are the main targets of the PMA, which advocates providing them opportunities within the free market for commercial production. There is little analysis in the plan of this target population, many of whom are poor candidates for commercial agriculture because of ignorance, small subsistence holdings, and little experience with the market economy. Clearly, the means of effectively engaging with the poor are not yet on line. The stated intention of the PMA is to focus on poor farmers; how to do so will challenge the Ministry of Agriculture, Animal Industry and Fisheries and the donor community.

B6. Conclusion

Uganda must implement existing policies, gain real coordination among hitherto competing agencies (like those for forestry and parks), and find ways to work with increasingly empowered district governments and private interest groups. Bringing management decisions down to the local level where affected parties can be part of the decision making process is good governance and good ecology. However, capacity and skills, coordination, communication, and finance are all problems that will be difficult to resolve; the GOU is likely to need significant assistance. Agriculture, wetlands, wildlife, and forestry programs will be donor-dependent for some time to come. Whether resource management agencies can become self-sustaining in the medium term

and whether they will truly reflect Ugandan priorities and gain strong domestic support are concerns that should be addressed by USAID in its program development.

C. Uganda's Partnership Matrix – Program Emphasis

The following matrix identifies the strategic focus areas of the PEAP/PRSP (the four pillars) and the comparative support offered by Uganda's development partners.

PEAP/PRSP – Strategic Focus Areas	Govt. of Uganda	USAID	Other Bilaterals	Multi-laterals	World Bank/IFC	Civil Society	Private Sector
Pillar I – Increasing the incomes of the poor Access to financial services Rural development							
	**	****	***	**	**	*	**
	***	****	***	***	****	****	**
Pillar II – Improving the quality of life of the poor							
Education Health/AIDS	****	**	****	***	****	***	*
Water and sanitation	***	****	****	****	****	****	*
	**	*	****	**	***	***	*
Pillar III – Creating a framework for economic growth and transformation							
Macroeconomic stability/rapid growth	****	**	**	***	****	**	**
Private sector development/trade	***	****	***	**	****	***	***
Energy/power	****	*	**	**	****	**	***
Transport/infrastructure/communications Environment	****	*	**	**	****	**	***
	**	***	***	***	**	**	*
Pillar IV – Promoting good governance and security							
Transparency/accountability	***	***	****	****	****	***	*
Decentralization Public service reform	****	***	****	***	***	****	*
Judicial system	***	**	***	*	***	*	*
	**	***	****	*	*	***	*

*   Low support from Uganda's development partners
****   High support from Uganda's development partners

# Framework for Selecting Among Strategic SO 7 Choices

A. Introduction

Decisions involving development investments are arrived at using a wide variety of criteria. Economic and financial values that suggest a particular intervention are only a small part of this decision-making process, and any comparison of two different types of investments is fraught with difficulties. As the Poverty Eradication Action Plan (PEAP) readily acknowledges, deciding among investments in, say, primary education versus rural roads entails too many variables to be subject to a simple formula. The screening framework proposed below acknowledges that limitation and seeks merely to articulate some of the strategic factors that need to be considered in the decision-making process. In other words, the framework attempts to make some of the criteria more explicit and common to the different comparisons.

We have attempted to give management a way to allow each contender for the Mission's limited resources to marshal their arguments in a consistent and comparable fashion. In the process, we ask the participants to pass each potential investment opportunity through a number of sequential "filters," using criteria that have been chosen to illuminate the likely impact of the intervention on the sustainable use of natural resources, whether for agricultural or environmental purposes.

B. Contextual Setting for the Framework

A vibrant agricultural sector, which serves as Uganda's engine of growth, and a resilient environment, which maintains the long-term natural wealth and productivity of the nation, are both firmly based on the sustainable use of natural resources. People and ecosystems are interdependent. They interact in a cycle, as shown below, in which human actions are both the cause and the result of environmental changes. This cycle can spiral either upward toward healthy prosperity for people and ecosystems, or downward toward deepening poverty,

The Problem/Solution Cycle

CHEMONICS INTERNATIONAL INC.
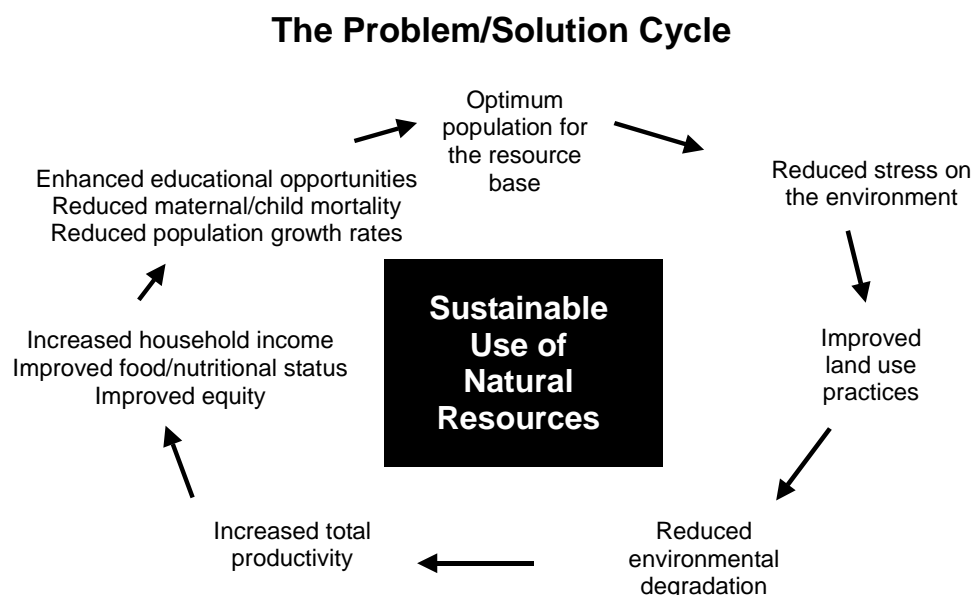
environmental degradation, and a loss of future options.

Improvements made at any point in the cycle are likely to have beneficial impacts on other components. However, we suggest that an ideal place in the cycle for high-leverage interventions is the <u>improvement of land use practices</u>. These improved practices will differ, according to the land use and ecosystem function proposed, along a spectrum from strict conservation through a range of multiple usage to environmentally responsible, intensive agricultural and resource-extraction activities.

C. Principles that Influence All Choices

C1. Principles of Sustainability

The global community has agreed in principle that human actions should be aimed at sustainability, using the earth's resources in such a way that future generations will be as well off as our own. A number of basic principles are generally agreed to be necessary to support sustainability. Most are based in "systems thinking," the recognition of linkages, interconnections, and relationships among dynamic elements. Since simple linear causation fails to describe most elements of the real world, any intervention that fails to address potential linkages and latent consequences may produce unwanted (and unwelcome) outcomes.

C1a. The Precautionary Principle

> "The first principle of intelligent tinkering is to keep all the parts."
> -Aldo Leopold, *A Sand County Almanac*

Many decisions and impacts relating to critical ecosystems are irreversible. Because planning and decision-making almost always occur within a context of inevitable risk and uncertainty, it is becoming increasingly common to invoke a "precautionary principle" that dictates that certain resources, sectors, or cultural and human conditions are to be kept intact through any development scenario. The Precautionary Principle does not deny the necessity of trade-offs but recognizes the imperative of avoiding irreparable or irreversible harm, in particular through ignorance of the possible long-term consequences of our actions.

C1b. Preservation of Natural Capital (Timeline, Resilience)

Despite the progress of technology, we continue to depend entirely on the earth's dwindling natural systems and resources to sustain us. Hydrological cycles, climate stability, and biological productivity can be viewed as the "capital" from which we draw the "interest" of ever-renewed fresh water, livable temperatures, and sustainable harvests. The essence of sustainability is to maintain our natural wealth by living on the interest rather than drawing down the capital. To continually draw down one's capital assets would eventually lead to bankruptcy. In the long run, the word "unsustainable" simply means "impossible."

The challenge in the Ugandan context is to maintain sustainability while also seeking to alleviate poverty. Short-term survival needs will inevitably take precedence over long-term sustainable practices unless ways can be found to undergird survival by short-term incentives that reward the sustainable use of natural resources. This is difficult but not impossible: for example, halting soil

degradation by improved farming practices provides a near-term payback to small-holder farmers in the form of increased yields.

C2. Necessary Conditions for Potential Investment

Program development is a process of identifying, selecting, and defining options. It ranges from broad, sectoral or cross-sectoral policy considerations to ever more specific filters, until the choices become targeted on a limited number of expected results. This movement from the general to the specific begins with broad concepts or categories of action, addresses USAID development themes and priorities, and becomes clearer as a set of options within a program framework. Final program choices result in the process of detailed project formulation.

In considering programs that will effectively invest USAID resources, certain essential conditions must be met. These are laid out below. For candidates whose ideas are not initially satisfactory, a policy dialogue with stakeholders may result in acceptable revisions.

Necessary Conditions

Is this program consistent with national and government priorities?	YES	NO	➡
Is this program consistent with USAID global policies and guidelines?	YES	NO	➡
Would this contribute to a balanced investment portfolio achieving the overall Strategic Objective?	YES	NO	➡
Would this avoid creating irreversible environmental damage or resource degradation that forecloses future options?	YES	NO	➡

Policy dialogue or reformulation of concept to be undertaken before further consideration of this option

D. Qualitative Assessment — Filter #1: Coarse Filter

In the following discussion, the concept of filters clarifies a process that is essentially recursive, or capable of being used again. Broad program formulations and specific actions are not the beginning and end of a linear process, but relate back and forth throughout the programming process. The possibilities and alternatives that result from a program direction may help redirect the program toward what is increasingly desirable. The filters suggested below are structures for comprehensive assessment of proposed actions. They are useful for including a range of policies, priorities, and themes in a complex analytical process.

A candidate program investment that meets the necessary conditions subsequently will be considered on essentially qualitative grounds. Passage of a program concept through Filter #1 is based on the best judgment of the Mission, with appropriate external inputs. The level of

investment in detailed data gathering should be low, based on available work. While the judgments are definitely qualitative, they are informed by what Robert Chalmers has called "appropriate imprecision," to emphasize the practical limitations on information that is needed rapidly and economically. "Qualitative" is not an absence of rigor, but implies working within an acceptable range of error. The degree to which the candidate fits the filter criteria should be easily demonstrable.

There can be no minimum "score" for passing this filter. This is so for two reasons. First, the measures are parametric and do not easily lend themselves to addition, subtraction, and division. Second, it is conceivable that this review will consider candidate program options that address a very narrow but critical part of the SO. This checklist serves to flag more and less desirable candidates, but cannot avoid the necessity for informed judgment by decision-makers.

Filter #1: Qualitative Criteria

1.	Potential for contributing to Uganda's economic growth objectives	High	Medium	Low
2.	Likely to have positive effect on geographic areas of importance to USAID program	High	Medium	Low
3.	Increase investment in productive sectors linked to USAID SO 7 program objectives	High	Medium	Low
4.	Probability that this will result in beneficial synergies with other USAID program objectives	High	Medium	Low
5.	Increase exports	High	Medium	Low
6.	Increase household incomes in selected areas or land use types	High	Medium	Low
7.	Likelihood that this will encourage and assist Uganda to help alleviate poverty in selected areas or systems and	High	Medium	Low
a)	lead to effective management of natural resources			
b)	reverse or ameliorate adverse trends and harmful activities, such as loss of biodiversity	High	Medium	Low
c)	encourage environmentally beneficial price and market reform for key commodities and resources,	High	Medium	Low
		High	Medium	Low
d)	stimulate private investment in and local management approaches to natural resources conservation, protection, and restoration			
8.	Potential for expansion to address similar problems elsewhere	High	Medium	Low
9.	Number of people who will be affected	High	Medium	Low
10.	Enhance value of environmental goods and services	High	Medium	Low
11.	Potential for positive change in resource access and income for poor, subsistence farmers	High	Medium	Low
12.	Increase household food security	High	Medium	Low
13.	Potential for including women in educational and income benefits	High	Medium	Low
14.	Probability that this will preserve valuable future options	High	Medium	Low
15.	Likelihood of leveraging national and other donor efforts	High	Medium	Low
16.	Will strengthen environmental implementation and planning capabilities of public/private sector at District level and below	High	Medium	Low
17.	Likelihood of positively affecting systematic planning and improvement in the efficiency of energy use and application of appropriate technologies	High	Medium	Low
18.	Likelihood this will contribute to the reduction of conflict	High	Medium	Low

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E. Quantitative Impact Criteria — Filter #2: Fine Filter

Once a proposed program initiative has been judged worth pursuing, its likely impact will be estimated. This estimate is necessary to appraise the magnitude of the program's anticipated effect and determine the measures and indicators under which progress will be judged. Sustainability is a meaningless concept without measures to demonstrate change over time. Such changes should be objectively measurable, verifiable, and replicable.

The basic questions the Mission must respond to are very clear:

1) What will this activity do to achieve sustained natural resource productivity and management while protecting or enhancing the environment?
2) What will be its direct and indirect effect on the poor?

The scope for impact measurement is very broad. It is neither feasible nor appropriate to list all the conceivable options for measuring probable program impact. Essentially, a new program initiative must be based on a satisfactory and convincing argument about its effect on economic growth, the well-being of Ugandans, the degree of sustainable resource use, and environmental protection or enhancement.

It is useful to set forth some of the questions that should be answered by a quantitative assessment of the probable impact of any program initiative. Representative questions include:

I.   Ecosystem Goods and Services
  a. What is the current and potential value of the goods and services conserved or protected?
  b. What percent of the total land area under this land use will be impacted in the area? What percent of the total extent of this land use in Uganda does this represent?
  c. What is the yield and trend of yield per land unit of crops, forest, livestock production, and the potential for change?

II.   Economic Growth
  a. What is the approximate marketable value of new goods and services that will be produced under this program?
  b. To what extent will household income increase?
  c. What will be the impact on GDP?
  d. What is the value, if any, of new export trade?

III.   Socioeconomic Welfare
  a. What are the numbers of subsistence and commercial farmers to be affected by this program?
  b. What will be the benefit incidence between subsistence and commercial farmers?
  c. What is the average income of those most likely to be affected by the program?
  d. What will be the effect on food security of this program?

It should be noted that the above list of questions would vary, depending upon the nature of the activity to be assessed. However, the objective of this process remains the same — namely, to pose program-level, as opposed to project-level, questions.

F. Desired Outcome: A Balanced Portfolio

No single USAID activity can be responsive to the various elements that make up Uganda's plan to eliminate poverty. However, a carefully crafted set of interventions that target the component pieces of the PEAP will cumulatively provide a strategically sound response. Such a balanced portfolio would be fully congruent with national priorities and USAID policy directives. The methodology proposed will help ensure that the decisions to fund the various components of the SO 7 portfolio have taken into account the contribution that each makes to the Mission's goal and to the objective of sustainable use of natural resources. It may also, in turn, be appropriate for application to decisions involving other elements of the Mission's program.

G. Potential Problems with the Framework

G1. Data Availability

> "Where is the knowledge we have lost in information?
> Where is the wisdom we have lost in knowledge?"
> - T. S. Eliot

Although there are significant quantities of data for many economic and social sectors in Uganda, that same data is not always accessible, accurate, reliable, current, or consistent. Data collection efforts generally pay attention to particular parameters, reflecting historic concerns and mandates. Some forms of information are inherently more difficult to determine than others. For example, measuring biodiversity is a relatively intractable problem compared to gathering census data. Quantitative data, in a form that can assist decision-makers in assessing trade-offs, is especially difficult to obtain, particularly with respect to environmental parameters.

Beyond data quality and reliability problems, an equally serious concern is encountered in assessing and analyzing the data for its applicability and relevance to decision-making. Decision-makers, both in the Mission and the GOU, whose confidence level is low in both the quality of the data that is generated and the analysis that flows from that data will be reluctant to put their trust in a process that relies upon such information. Given the evident gaps in data, efforts should be made to alert decision-makers at the district level to those shortcomings so they can take steps to strengthen local data collection and analysis where possible.

G2. Scale Problems

A problem the team has repeatedly encountered arises, we believe, from the hierarchical nature of systems. In particular, methods and indicators suitable for evaluation and assessment purposes at one scale are unsuitable or inapplicable at another scale. Scale is not a mere matter of aggregation. Emergent properties at different scales can confound attempts to summarize "the facts" in simple terms. This is a problem for the application of quantitative indicators. For example, a particular environmental indicator of water quality, such as Biochemical Oxygen

Demand (BOD), is appropriate at a given site. However, it is less useful as a measure of water quality for a region.

H. Dealing with Data Gaps: A Suggested Agenda

In developing countries, accurate statistical data is often not available or not easily accessible. This is true for economic and social measurements as well as agricultural production figures, natural resource use, and health and population figures. The stringent demands on the GOU and donors for action in addressing poverty or natural resource degradation easily overwhelm the need for better and more accurate information for planning and monitoring. In a sense, this is as it should be, since the problems faced are complex and immediate, and the consequences of not addressing them are grave. Yet programs to eliminate poverty or reduce environmental degradation are effective because they have demonstrable impact on the socio-economic well-being of the poor, create measurable income opportunities, or result in sustainable productive technologies. The lack of information for planning and assessing programs creates a kind of debt that ultimately is paid in wasted resources, inappropriate interventions, unproven effectiveness, and an unclear program future.

In Sections II and III of this report, available data have been gathered and collated for purposes of identifying appropriate focal concerns for USAID program consideration. With the exception of the census data (1991), most of this is available to analysts as district or regional level summaries or estimates. As mentioned in Section V, data available at the district level constrains program responses. The district is a politico-administrative unit and does not necessarily reflect ecological relationships, economic patterns, and production or trade networks. While the data presented in this report are valuable and well worth considering, they would be much more reliable and useful if available at more disaggregated levels such as parish, village, or even household.

Aside from the geographic limitations, there are other constraints to the data:

- Sources are not clearly stated.
- Important program level analysis has to be derived from different reports collected for varied and limited purposes.
- Collection methodologies are not always clear, and some estimates assume linear change of estimates from 30 or 40 years ago.
- Estimates of changes and trends are at best speculative; thus, program sustainability cannot be confirmed.
- The current absence of regular and consistent cycles of data collection capable of providing specific detail on environmental and socio-economic trends over time is a limitation on good programming and monitoring practice. This has rapidly accelerating cost implications for all donors, as program implementation is based on guesses and estimates.

A methodology based on opportunistic samples and in-depth review of selected cases is a useful and increasingly popular tool that ameliorates some of the data gaps[1]. The recent *Uganda*

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[1] See, for example <u>Shortcut Methods of Gathering Social Information for Rural Development Projects</u> by Robert Chambers, in Michael Cernea (ed), <u>Putting People First: Sociological Variables in Rural Development</u>, The World

Participatory Poverty Assessment Report is an example of this quite economical data collection technique. Much of the current International Food Policy Research Institute (IFPRI) research is also based on these techniques, which have been refined over the last 30 years — first as **rapid rural assessment** and now as **participatory rural assessment** (PRA). The method relies on observation by expert interviewers, participation by stakeholders in data collection, and on qualitative assessment of issues. The result of this kind of appraisal is a reasonably accurate understanding of the processes that comprise social and economic decision-making, and therein lies the value of current IFPRI research. For example, IFPRI's market analyses based on in-depth interviews with traders should result in valuable understanding of market processes, obstacles to commercialization, and the valuation of products. It might also reveal a great deal about how inclusive the market is for new, formerly subsistence producers. PRA techniques are strong in providing valuable contextual information derived from observation. ***This is so because a research finding derives "meaning" from its place within a larger body of events often of so complex a nature that no sets of objective statistical measurements will reveal that which is meaningful from that which is not.*** The knowledge of social, economic, and ecological reality derived from those closest to events is valuable for interpretation of problems, their possible resolution, and the effectiveness of programs. In addition, the cost of generating accurate quantitative measures both in terms of funds and time is often far beyond the budget and requirements of those who need to make judgments about projects and programs.

Participatory Rural Appraisal (PRA), when used as a data collection technique, is a highly professional, time-constrained technique for using indicators to approximate data otherwise not available. PRAs differ from other research techniques in several important ways. Generally, they are:

- Cost efficient, collecting only what is needed for the purpose at hand
- Highly focused on known concerns and do not attempt complete knowledge of an area
- Selective and not random, using cross-checking of data as a control of validity
- Indirect, with a high use of inferred information
- Mmulti-disciplinary, with individuals — especially community residents — lending perspective to each other's assumptions and creating a composite view of the existing system
- Experience-intensive, requiring individuals with a broad background capable of assessing complex situations.

These techniques have been used for fairly precise and technical applications, including the mapping of micro-ecosystems and soil types. Proper involvement of community knowledge of resources can yield sophisticated detail.

Current IFPRI research will result in vastly advanced knowledge of the processes underway in much of rural Uganda. Although this work will not substitute for the national surveys and censuses needed to measure the impact of large-scale programs, it will provide guidance for program development. To the extent that it is consistent with its current program, it would be

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Bank 1985, pp.399-415. See also the discussion in <u>Project Monitoring and Evaluation in Agriculture</u> (Casley and Kumar, 1987) for more on the value of carefully contrived assessment, and how it differs both from scientific research and random observation.

useful for IFPRI to extend its research activities to include data on the following over time and on as fine a geographic scale as practicable:

- Direct measures of soil fertility/degradation — erosion, productivity losses, loss of topsoil, etc.
- Land management systems by ecosystem or land-use type
- Fragmentation and size of land holdings
- Tenure arrangements
- Rates of biodiversity and agro-biodiversity loss, especially outside of protected areas, by ecosystem or land-use type
- Rates and amounts of biomass removal, for what purposes (construction timber, poles, charcoal, firewood), by area and volumes, preferably by types also (e.g. "high-grading" of large, mature hardwood trees), by type of cover (natural forest, plantation, savannah, woodland), and by ownership/tenure type; also marketed/non-marketed (own use)
- District capacity for environmental management — e.g. is there a district environmental officer; has a district environmental action plan been done; and what is its relationship with plans suggested by the PMA
- Relative rates of land-use conversion (e.g. deforestation, wetland conversion) on lands managed/supervised by national, district, and local-level authorities; on various tenure types

No amount of process-centered data will provide donors or the GOU with information about the extent and location within Uganda of the changes anticipated in programs. Socio-economic information, which is regularly collected and country wide, is needed as the basis for impact measurements that will guide future program development. Series of interventions based on current, limited information will require revision and modification. Survey and census data using random sampling techniques and covering the entire country or specific regions will be needed to determine both the scope of impact and the requirements for the future and to ensure that government and donor expenditure achieve their purpose. The revised PEAP (July 2000) demonstrates an interest on the part of the GOU in detailed monitoring and in upgraded reporting on social indicators. NEDA and the Ministry of Agriculture, Animal Industries and Fisheries are engaged in creating and upgrading environmental and production indicators. This is a healthy and much-needed initiative to collect and use impact measurements within a broad programmatic framework.

The GOU will need some assistance in turning a large number of disparate data sets into the kind of information needed for program evaluation in the future. Data acquisition is only a first step toward a useful system of information generation and dissemination. Appropriate assistance, perhaps to the Ministry of Finance and Economic Development, in refining information collection methods and in ensuring that the product of that effort is useful for program review and program design would be valuable and earn a significant return in improved targeting of effective programs.

Criteria-Based Selection of Investment Options

Uganda's economy will continue to be agriculturally based for the foreseeable future. Agriculture can only continue to serve as the primary engine of economic growth for Uganda if production increases faster than population growth. Therefore, Uganda's growing population has not only to produce sufficient food to feed itself and generate surpluses for economic growth, it must also sustain this increase in production, using practices that do not cause major deterioration in the potential of the total resource base. Sufficient food without the forest resources available for fuel to cook that food is not a desirable end result. Tradeoffs are inevitable; however, some are better than others.

The Government of Uganda's goal is to reduce poverty by encouraging economic growth through increased agricultural productivity, while mitigating negative environmental effects. Though to most outside observers, the latter objective is not as evident as the former, USAID/Uganda has chosen to pursue both objectives with equal vigor. This requires the Mission to view future investments through the twin lenses (economic growth/agriculture and environment) of the new SO 7—the sustainable use of natural resources. This wider view considers all the resources, processes, inputs, and outputs in a particular area and examines the entire range of goods and services that come from the resource base, not just the agricultural.

Fortunately, a growing number of options appear to address these multiple objectives. They range from fair trade/certified sustainable products, such as shade-grown bird-friendly specialty coffee, to agroforestry techniques, such as contour hedges and mulching, to agronomic approaches, such as green manure, minimum tillage, and integrated pest management. Sustainability analysis, conducted like environmental analysis, can draw out the implications, consequences, and tradeoffs of the options being considered.

The key is to use the current biophysical and environmental data sets—with all their inconsistencies and errors—to identify the geographic locations with the best opportunities or those that are most threatened. We present for consideration criteria that can be used to define, compare, and rank the districts in Uganda, comparing them in terms of (1) their potential to increase agricultural production by expansion into new lands; (2) the effects of current and projected population pressure on the existing natural resource base (forests, woodlands, and wetlands); and (3) their suitability for targeting large numbers of poor people.

The primary intent is to illustrate an approach and to provide a first cut at some rankings that will allow Mission staff to cluster areas with similar interesting characteristics. The process has the advantage of being adaptable to ranking areas by any variables the Mission deems important. We have chosen to illustrate the utility of the technique using characteristics of particular interest to the Mission: potential productivity, pressure on the natural resource base, and poverty.

Some of the problems associated with attempting a more rigorous description of the situation in Uganda is that there are no good comparable data for many important variables, e.g., average

number, size, or tenure arrangement of land holdings by district. The diversity of data types and the sheer volume of conflicting details can rapidly cloud the big picture.

Using a small number of key criteria, the units can be separated into a few larger clusters of districts with similar characteristics, e.g., those districts with large numbers of poor people, significant forest and wetland resources, and limited room for agricultural expansion. Within the resulting matrix other factors considered important can be overlaid to further refine the targeting. These might include data on conflict, types of protected areas, or existing Mission activities.

The following section illustrates the process, ranking districts on the basis of the three factors chosen to produce a set of district clusters that combine high, medium and low levels of the desired characteristics.

A. Potential Agricultural Productivity

The amount of land potentially available for new production is one factor that might influence selection of a particular district, either for interventions designed to enhance productivity or for those aimed at expanding total production. Uganda's districts were compared in terms of the possible area for expansion, calculated by subtracting area currently farmed from an estimate of total cultivable land. This separates districts with apparently limited land for future expansion from those with apparent potential for expansion.

Each district was then ranked high (3), medium (2), or low (1) using three criteria that influence the potential productivity of expansion land: climate, soils, and access to markets. Combining the two measures, available area and potential productivity, gives a ranking of the district's potential for increases in productivity. Expansion land area times climate plus soils times access to market produces the district ranking. Broadly speaking, a district with a high score will have greater agricultural potential than a district with a lower score. Table 1 illustrates the methodology; figure 1 shows how using this type of ranking clusters the districts. Detailed tables for these and other measures used in this section are provided in Annex C.

Table 1: Districts Ranked by Potential for Agricultural Expansion

District	1974 Estimate Cultivable Area (ha)	1990s Estimate Farmland (ha)	Calculated Proportion Currently Cultivated	Calculated Potentially Available (ha)	Assigned Climatic Score	Assigned Soil related Score	Assigned Market Access Score	Calculated Ranking
Luwero	501,300	146,600	0.29	354,700	2.5	2	3	15.96
Mbarara	816,400	282,600	0.35	533,800	1.5	2	2.5	15.57
Masindi	536,900	175,100	0.33	361,800	2	2	2.5	10.85
Mubende	542,900	339,700	0.62	203,200	3	2	2	6.77
Soroti	382,500	226,000	0.59	156,400	1.5	2	1.5	2.74
Bundibugyo	39,400	36,500	0.93	2,900	3	3	1	0.06

Method: The total cultivable land area figures for 1974 are based on estimates made then by B.W. Langlands. New districts were assigned cultivable area based on the ratio of their total new area to the old district area. The 1990s figures are the estimates made by the Biomass survey in the 1990s. The next column compares total cultivable area with the area currently farmed.

Figures in the "Assigned" columns are initial coarse estimates of factors influencing the potential productivity of the land in each district. From these assigned values for each district a weighted district rank was calculated (the last column). Climate and soils are additive in their influence, so a larger amount of land with favorable scores has more potential than a smaller amount. Because access to markets is critical in eliciting increased production, it has been given greater weight.

To arrive at a comparative score, the product of the scores for soils plus climate multiplied by the potential area for expansion was then multiplied by the market access score. Thus, a smaller amount of land with favorable soils and climate and good market access is assigned a higher score than a larger amount of land with the same absolute productivity based on soils and climate, but with less favorable market access.

This score is used as a rough proxy for the likelihood that a district can contribute to overall increases in food production by expanding its agricultural area. A similar approach can be used to estimate the likelihood that a district can increase production from its existing farmland. Further refinement would allow targeting of smaller areas, such as counties or even parishes, within a district with high potential.

Figure 1: Districts Clustered by Available Expansion Area and Production Potential

		Potential Expansion Land Area Available		
		High	**Medium**	**Low**
Ranking of Land Potential Productivity	High	Mubende, Rakai, Kiboga, Luwero, Kabarole, Masindi. Mbarara, Gulu, Moroto, Kitgum, Kotido	Masaka, Mukono, Mpigi,	
	Medium	Nakasongola, Arua,	Kapchorwa,Kumi, Ssembabule, Bushenyi, Soroti, Adjumani, Hoima, Kibaale,	Mbale
	Low		Ntungamo,Nebbi, Moyo, Kamuli, Lira, Apac, Katakwi,	Jinja, Bundibugyo, Busia, Kisoro, Pallisa, Tororo, Bugiri, Kalangala, Kabale, Iganga, Kasese, Rukungiri

Figure 1 clusters districts by comparing the amount of land available for potential expansion (high, medium, low) with the current ranking of its potential productivity based on soils, climate,

and access to markets. Districts in the top left-hand box appear to be good prospects for production increases; those in the lower right corner require a different approach, possibly intensification of existing agriculture.

B. Population Pressure on the Resource Base

The next set of rankings is of current and future population pressures on the resource base in a district. These compare Uganda Bureau of Statistics population projections with cultivable and farmed areas, along with estimates of the total area of THF, woodland, and wetlands in a district.

This exercise allows us to compare currently farmed area with cultivable area. It is assumed that (1) districts that already have a larger number of people per farmed hectare are most likely to expand onto new land, and (2) districts with more people per cultivable hectare (hectares of the same potential) are less likely to have marketable surpluses.

Table 2 shows examples of how districts can be ranked by estimates of numbers of people per farm hectare, per cultivable hectare, and per THF hectare. Similar calculations were done for of wetlands and woodlands. The analysis can be extended to protected areas, buffer zones, etc.

	Table 2: Districts Ranked by Population Pressure on the Resource Base					
District	Proportion Cultivable Currently Farmed	Land Available for Expansion (ha)	Pop. 2000 People/ Farm ha	Pop. 2010 People/ Cultivable ha	Pop 2000 People/ Hectare THF	Pop. 2010 People/ Hectare THF
Rukungiri	1.13	(18,500)	3.58	5.62	15.6	21.6
Kasese	0.73	40,600	4.18	3.77	10.7	13.3
Bushenyi	0.67	105,300	3.63	3.17	11.0	14.3
Masaka	0.58	124,600	5.14	3.69	57.7	71.0
Mukono	0.60	162,000	4.62	3.63	10.9	14.2
Mbarara	0.35	533,800	3.67	1.58	268.1	332.5
Masindi	0.33	361,800	2.11	0.94	7.0	9.5

Adding the dimension of time helps to illustrate the dynamic between population growth and current and future pressure on land, forest, woodland, and wetland resources. Refining the analysis could also show the varying potential of farmland by district, rural versus urban populations, the possibility of internal migration, differences in how resources are exploited, variation in access to the resources, etc.

Figures 2 through 4 cluster districts by population pressure on current farmland: High = more than 3 people/farmed ha, medium = 2-3 people per farmed hectare and low = < 2 people per farmed hectare. The range is from 6.79 people/farmed hectare (Jinja) to 0.77 people/farmed hectare (Kitgum).

Figure 2: Districts Clustered by Current Area of Forest and Population Pressure

		Population Pressure on Current Farmland		
		High	**Medium**	**Low**
Area of Tropical High Forest	**High**	Mukono		Kibale,
	Medium	Mpigi, Kapchorwa, Bundibugyo, Kasese, Rukungiri, Kisoro, Mbarara	Hoima, Kabarole, Masindi	Mubende
	Low	Busia, Iganga, Jinja, , Mbale, Pallisa, Tororo, Luwero, Masaka, Rakai, Bushenyi, Kabale, Ntungamo,	Arua,Kotido, Moroto, Moyo, Nebbi, Bugiri, Kumi, Kalangala, Kamuli	Adjumani, Gulu, Kitgum, Apac, Lira Katakwi, Soroti, , Kiboga, , Nakasongola, Sembabule,

Total THF in a district ranges from 103,490 ha in Mukono to 10 hectares in Jinja to zero in many districts. High in this matrix = >1,000 sq. km, medium = 250-1,000 sq. km, and low = <250 sq. km.

Figure 3: Districts Clustered by Current Area of Woodland and Population Pressure

		Population Pressure on Current Farmland		
		High	**Medium**	**Low**
Area of Woodland	**High**	Luwero, Mpigi, Bundibugyo	Arua, Kotido, Moroto, , Hoima, Kabarole, Masindi,	Gulu, Kitgum, Adjumani, Kiboga, Nakasongola, ,
	Medium	Kasese	Moyo,	Apac, Lira, Mubende, Kibale,
	Low	Busia, Iganga, Jinja, Kapchorwa, Mbale, Pallisa, Tororo, Rakai, Mukono, Masaka, Bushenyi, Kabale, Kisoro, Mbarara, Ntungamo, Rukungiri	Bugiri, Kumi, Kalangala, Nebbi, Kamuli	Katakwi, Soroti, Sembabule

Total woodland in a district ranges from 733,680 ha in Kitgum to 470 hectares in Kabale. High in the matrix in Chart 3 = >100,000 ha, medium = 50,000-100,000 ha, and low = <50,000 ha.

Figure 4: Districts Clustered by Current Area of Wetland and Population Pressure

		Population Pressure on Current Farmland		
		High	**Medium**	**Low**
Area of Wetland	**High**	Iganga, Luwero, Mpigi, Mukono, Rakai, Bundibugyo, Mbarara,	Moroto, Kumi, Kabarole, Masindi, Kamuli	Lira, Apac, Katakwi, Soroti, Nakasongola,
	Medium	Pallisa, Tororo, Masaka,	Kotido	Gulu, Kitgum, Kiboga, Mubende, Sembabule, Kibale,
	Low	Busia, Jinja, Mbale, Kapchorwa, Kabale, Bushenyi, Kasese, Kisoro, Ntungamo, Rukungiri	Arua, Moyo, Nebbi, Bugiri, Kalangala, Hoima,	Adjumani,

Total wetland in a district ranges from 187,820 ha in Katakwi to 432 ha in Kisor. High in this matrix = >100,000 ha, medium = 50,000-100,000 ha, and low = <50,000 ha.

C. Population Pressure and Poverty

Table 3 shows an estimate of the number of people in the lower expenditure quartile in a district, ranking districts by the number of poor people. Figure 5 clusters the districts according to potential.

Table 3: Examples of Poverty Measures in Selected Districts

District	Population 2000 (est.)	No. in Lowest Quartile	Poverty Rating	HDI Index
Kitgum	499,100	316,929	3.17	0.264
Arua	841,200	273,390	2.73	0.309
Mukono	1,128,500	240,371	2.40	0.440
Masaka	895,100	183,496	1.83	0.425
Luwero	512,700	138,429	1.38	0.414
Bushenyi	783,800	119,921	1.20	0.415
Mubende	621,000	121,716	1.22	0.396
Masindi	369,600	121,229	1.21	0.385
Kasese	447,500	102,030	1.02	0.422
Mbarara	1,037,500	70,550	0.71	0.373
Bundibugyo	174,800	26,220	0.26	0.311

Figure 5: Districts Clustered by Absolute Numbers of Poorer People and the UNDP's Human Development Indicator (HDI)

|		Absolute Numbers of Poorer People		
		High	**Medium**	**Low**
UNDP Human Development Indicator	**High**	Mukono	Bushenyi, Kabale, Luwero, Rukungiri, Masaka , Kasese	Hoima, Jinga, Kalangala, Kampala, Kapchorwa, Nakasongola,
	Medium	Mbale, Kamuli, Iganga, Arua,	Apac, Gulu, Kamule, Lira, Masindi, Mubende, Nebbi, Pallisa, Soroti, Tororo	Mbale, Bugiri, Bundibugyo, Busia, Katakwi, Kibale, Kiboga, Mbarara, Ntungamo, Sembabule
	Low	Kitgum		Adjumani, Kumi, Moyo,

D. Combining Clusters (Population, Poverty, and Productivity)

In the examples above, population, poverty, and potential for agricultural production without destroying the resource base were the defining characteristics—low versus medium to high availability of good land for expansion, the extent and the rate of increase in pressure on the existing resource base and relative numbers of poor people. How districts are clustered depends on the particular objective and the data available.

In our choices, we have used three criteria suggested by the Mission, examined them independently and in terms of their interactions. Using that information, we have created three illustrative clusters of districts where the Mission might consider making investments—if district-level criteria were the sole basis for the decision. That is generally not the case. Factors influencing choices can vary greatly, ranging from the purely economic to political and security considerations, distance, logistical issues, and a host of other factors.

But there is a practical limit to designing programs that distinguish among parts of district, or that focus on portions of the population, or on especially important crops. As useful as it may be to rank districts, and as much as that is necessary based on existing data, the limitations of such ranking become clear. Until information is available at the household or parish level, plans have to be based on aggregated district data. Ideally, by the time a project is being designed, more refined information will have been collected. The lesson is clear: it would be advantageous to have finer household or parish-level data as early in the design process as possible.

Figure 6: Potential Productivity vs. Population Pressure
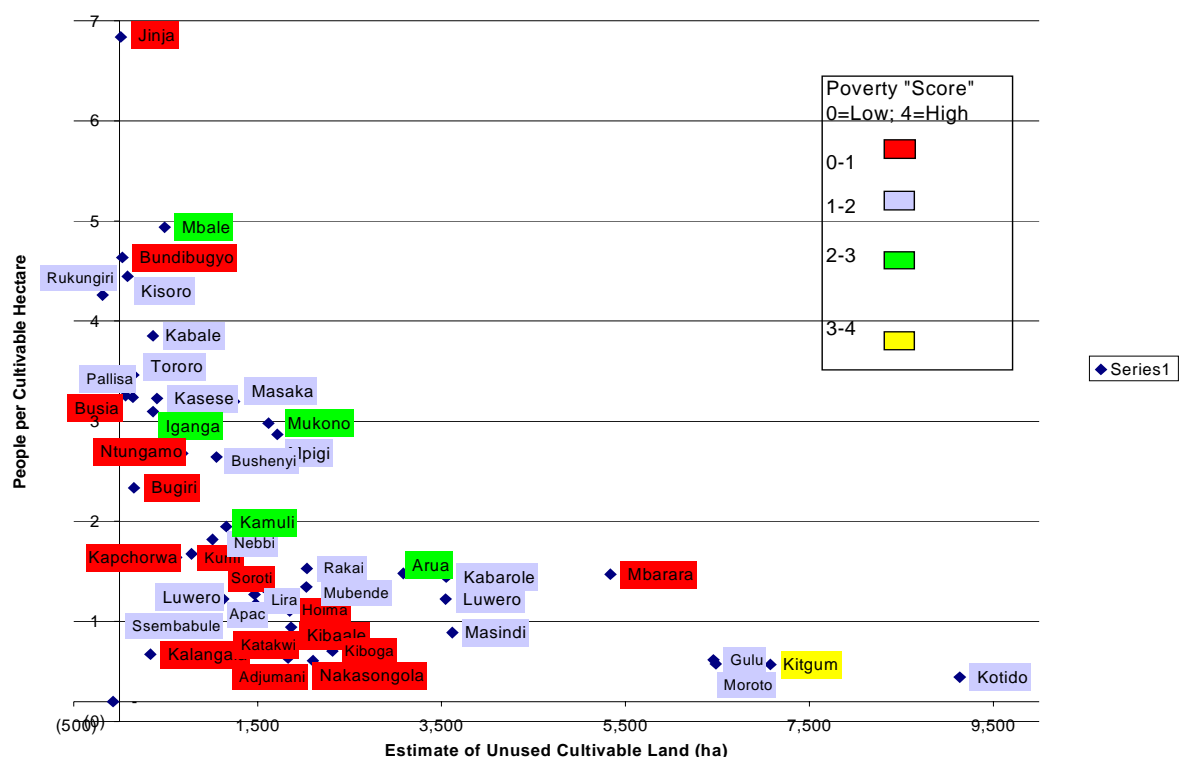
In our review of the information and the possibilities for using it for programming, it became clear that in Uganda many programming choices are geographic. Investments that aim for a major, sustainable impact on poverty have to have a location.

We used our first iteration of the ranking technique to generate a selection of clustered districts on the basis of previous program activities, likely benefit impact, potential for productivity, and practical geographic considerations. This was essentially an exercise of choice and observation of relatedness among those districts that ranked relatively high on our desired population, poverty, and productivity criteria. Although the process of clustering involves choice, and it is quite likely that Ugandan districts are linked to each other in many different ways, there are some relatively natural clusters. We then evaluated these clusters within the context of our qualitative filtering system (table 4). The results are logically and qualitatively interesting; they should generate the sort of structured discussion about choices that the Mission desires.

All the preliminary analysis here can be refined to better serve particular goals. We hope that it can serve as the catalyst for an ongoing process. What we did not have time to do was to draw out in detail the program implications of this particular approach. The meaning of all the numbers that can be produced to describe productivity, population pressure on the resource base, and poverty surrogates needs to be thought through further, preferably through internal Mission discussions and through a wider interaction with USAID's clients and partners.

Table 4 takes a sample of three contiguous clusters of districts that have emerged from the analysis. We have assumed that these would be the focus of new investments and have applied Filter #1 (fine filter) questions, applying qualitative criteria to further differentiate between the clusters.

But a whole series of other questions are provoked by the data. For example: What are the implications for Uganda's efforts to alleviate poverty of the amount of land in a particular district under various land use classifications? How well do the measures or descriptors we used address the potential for commercial or for improved subsistence farming? What implications can be drawn from these population projection figures for production potential, rural infrastructure needs, the likelihood of conflict over resources, the need for service industries to draw off excess agricultural labor, the likelihood of irreversible degradation of a particular resource, etc.?

Ideally, USAID would consider refining this analysis further, perhaps to the point where it could serve as a basis for a series of seminars or workshops on a subject like "the long-term implications for Uganda and its partners of the pressures on its resource base."

Table 4: Filter #1: Qualitative Criteria
(ranked L(low), M(medium), or H(high)

	Cluster 1 Rukungiri, Kasese, Bushenyi, Bundibugyo	*Cluster 2* Masaka, Mbarara, Mubene	*Cluster 3* Makono, Luwero, Nakasangolo, Masindi
1. Potential for contributing to Uganda's economic growth objectives	M (Tourism)	H	M
2. Likely to have positive effect on geographic areas of importance to USAID program	H	H	M
3. Probability of beneficial synergies with other programs or objectives	M	M	H
4. Likely to increase investment in agricultural sectors linked to USAID program objectives	L	H	H
5. Likely to increase exports, where appropriate	L	H	H
6. Likely to increase household incomes in selected areas or land use types	M	H	H
7. Likelihood that this will assist Uganda in alleviating poverty in selected areas or systems and			
a) Lead to effective management of natural resources	M	H	H
b) Reverse or ameliorate adverse trends and harmful activities, such as loss of biodiversity	H	L	H
c) Encourage environmentally beneficial price and market reform for key commodities and resources	L	L	L
d) Stimulate private investment in and local management approaches to natural resources conservation, protection, and restoration	H	H	H
8. Potential for addressing similar problems elsewhere	H	H	H
9. Likelihood of leveraging national and other donor efforts	L	M	H
10. Number of people who will be affected	H	M	M
11. Enhance value of environmental goods and services	H	L	H
12. Potential for positive change in resource access and income for poor	H	M	H
13. Increase household food security	H	M	H
14. Potential for including women in educational and income benefits	H	M	H
15. Probability that this will preserve valuable future options	H	M	H
16. Potential for strengthening environmental implementation and planning capabilities of public and private sector at district level and below	H	M	H
17. Likelihood of positively affecting systematic planning and improvement in the efficiency of energy use and application of appropriate technologies	H	H	H
18. Likelihood this will help reduce conflict	H	L	H

Strategic Level Policies

The team has identified four policy issues that will to varying degrees affect any new SO7 initiative.

A. Priorities of the Government of Uganda

The GOU's current policy initiatives include universal primary education, poverty eradication and economic growth, private sector development and increased trade, financial reform and restructuring, reduction in the responsibilities of the public sector, and decentralization of many government activities to district and subdistricts. All these policy initiatives are needed (some are long overdue). Yet together they stretch the nation's fiscal and human resources to the limit, resulting in intense internal competition.

A choice of policies means choices about the allocation of scarce resources. Since Ugandan resources are inadequate to effectively implement all these initiatives, donor agencies supplement them. In recent years such support has amounted to as much as 60 percent of the GOU budget. However, while current support levels continue, donors obviate the need for the GOU to set priorities needs and make hard choices about what policies it can continue to implement. Thus, although donor agencies are heavily involved with analysis, articulation, and sometimes advocacy of policies, whether initiatives can be sustained about donors withdraw is a serious question. Which among these initiatives can the GOU adequately support? This should be of immediate concern for the government and all donors. It certainly forces USAID to consider important strategic choices.

Programs that concentrate assistance on systemic changes within Ugandan capabilities avoid that problem. A compelling case can be made for supporting efforts that strengthen decentralized planning and coordination, systems of sustainable resource management, education about use of natural resource uses, assessment of environmental impacts, and dissemination of environmental information. Some of these already receive USAID support.

That case argues for creating more private sector incentives for use of sustainable resources that complement other resources. For example, the GOU plans to establish independent self-supporting authorities to manage parks and forests using private sector management methods and incentives; here American assistance might be especially apt. Similar opportunities exist elsewhere.

The programmatic challenge for the Mission is to identify systemic interventions that also fit within GOU priorities (regardless of changes in funding levels). Doing so will do two things: (1) largely remove USAID from jousting with other donors for resources, and (2) greatly enhance the likelihood that the programs it chooses to support will be sustainable.

B. Managing Change Over Time

The rural poor have no choice but to use natural resources for their subsistence and income. As population increases and expectations rise, poverty itself becomes a major threat to the environment and a cause of natural resource degradation. Environmental problems like deforestation, soil degradation, deteriorating water quality, and conversion of wetlands and marginal lands to more intensive uses may result from short-term gains in production or monetization of resources. Frequently, the cost of producing the resource itself forms little or no part of the transaction; this is true for firewood extraction, fishing, or draining wetlands.

Continued expansion of natural resource use is neither realistic nor sustainable. An economy based on small primary producers who are also the main consumers of their own products has little scope for growth. Programs that favor investment in exploiting natural resources ultimately will confront a reduction in marginal returns and possible catastrophic degradation and loss of natural resources. Technological advances in crop production—needed for food security and export earnings—may, perversely, marginalize poor rural people who are unable to make the investments needed to achieve economies of scales. These general relationships are not in dispute, although the lack of information linking systems, causes, and effects makes it difficult to coordinate policy development and planning.

To reduce poverty through agricultural development and the amelioration or reversal of natural resource degradation, Uganda must constantly respond to conditions that are changing as a result of its policies. The short-term benefits that arise from each Ugandan sectoral program affect the long-term sustainability of the rural economy and the overall economic growth of Uganda.

Sustainable management of natural resources requires that the GOU plan its program based on a long-term vision of Ugandan growth and development. This should accommodate the socioeconomic changes that occur when an economy based largely on subsistence poverty evolves to one with stronger industrial and service sectors. As the economy grows, changing conditions and opportunities—some known, others totally unexpected—will result. How the Ugandan government and the private sector respond to these changes will be critical to achieving sustainability with a productive and stable environment.

Programs to increase agricultural production and improve marketing are immediate steps toward eradicating poverty; they are key to income generation in the rural areas. Yet this approach, by itself and continued indefinitely, could simply lead to "sustainable" poverty, with production gains overwhelmed by more and more people using degraded resources. To achieve a continuing net benefit for everyone, second and third order plans must be in place. These should anchor continued improvement in the quality of life to technologies related to sustainable use of natural resources and to goods and services industries that do not demand increasingly intense use of natural resources. The need for research and technology transfer is clear.

 GOU plans for universal primary education, the long-term potential for tourism, and the service demands of a large and better-off populace are a few of the elements to be taken into account in guiding sustainable growth that addresses both the needs of the poor and the imperative for overall economic growth. While the GOU's 2025 Plan and the PEAP set forth the general

direction, a more detailed analysis of the factors involved in long-term growth would help in understanding, adapting, and responding to changing conditions.

C. Decentralization

GOU policy favors reduced central government structures and control, with increasing operational responsibility at the district level. Central government encourages, regulates, informs, and often provides key investments and opportunities, but districts set many local operational priorities. Districts now have real authority. They receive significant funds from central government grants and from locally generated tax revenue. Certain activities remain the responsibility of individuals, private investors, and NGOs.

While decentralization presents many wonderful opportunities, it creates equivalent challenges. These challenges may just be dawning on donor agencies. In a more unified government structure, programs are integrated through lines of responsibility from central to local offices. Where real responsibility and authority is based on elected councils, each of which makes its own choices about staffing and programs, there is no ready linkage of programs. With more than 55 districts in Uganda, how best to work with them on district environmental action and development plans and support appropriate investments is not yet clear.

The team sees decentralization as a policy favoring sustainable resource use, but one that demands that national and local government and individual resource users overcome some obvious obstacles.

A shortage of human resources among government and private partners at the district and subdistrict level is a serious obstacle to decentralizing. Central government's continued willingness to provide grants to districts is likely to be contingent on a relatively high level of organization and planning. Real responsibility for setting and implementing their own priorities vested in local officials and local people increases the need for transparency and accountability. If district residents are to fully participate in managing their own natural resources, there must be strong support for educating community members, their elected officials, and the staff employed by district councils. Investments in capacity building at all levels are a critical priority if the decentralization policy is to succeed.

In the context of SO7, decentralization will clarify the linkage between the environment and economic growth/agriculture that is evident at the local level. In Masindi District, for example, the district environmental action planning process brought together environment and agriculture staff, used participatory rural appraisals in 505 villages, and gathered information through 14 subdistrict task forces. Many of the environmental concerns identified by villagers relate directly to agricultural production—pest control, poor farming practices, overgrazing, and bush burning. At the local level people, poverty, natural resource degradation, production opportunities, and local organizations all come together. This offers the opportunity of creating an increasingly seamless core of shared perceptions of resource potential, threats, and opportunities.

Integrating program activities affects districts, subdistricts, villages, and ultimately individual farms. That is why awareness by village leaders, district officials, and NGO advisors is vital to the success of decentralization. But they are likely to succeed only if they share a similar

language and agree on methods for responding to environmental, natural resources, and agricultural production problems.

Through its NGO partners, USAID/Uganda has been working for some time to build capacity at the local level. Its support for private sector activities comes at the same objective from another direction. In the future, if the Mission chooses to continue the geographic focus of its programs, whether SO7, SO8 or SO9, capacity building needs to be expanded so that the benefits of decentralization are fully realized.

D. Program Planning below the Regional Level

The rural economy results from the way people accommodate to the opportunities and constraints presented by their environment and the laws and institutions within which they operate. Their experience is local. Soil types, land tenure, rainfall and altitude, proximity to roads and markets, educational institutions, availability of finance, regulations over resource use and their enforcement, availability of technologies, and intensity of resource competition are some of the many factors to which individuals and families must adapt. People living close to each other, dealing with similar problems, tend to display similar behavior. Classifications of land use types across thousands of square kilometers of Ugandan land and population represent the outer limits of this approach. Microeconomic studies at the farmer or village level provide an example of useful analysis for understanding adaptive processes, but give little clue to their extent.

Human adaptive response to changing conditions is more than a simple analogy to the adaptation by plant and animal communities to their own biophysical environments. It is a manifestly more complex subset of how life grows, adapts, and changes.

The energy transfer and resource use systems of agriculture and animal husbandry are essentially ecological. That is why environmental considerations are integral to sustainable economic growth—not simply an add-on to development planning. Planning must predict the desirable response based on accurate knowledge. The need to adapt to a large number of conditions determines what people will do and why they will do it. It is axiomatic that reducing poverty requires an ecology of poverty based on the potential for response to opportunity.

Though these concepts are the basis for planning the sustainable use of resources, they tend to be ignored in practice. Where complete information is not available, and how people will adapt is not clear, it is common for development planners to focus on the information that *is* available. Therefore, in Uganda, it is much easier to come up with national or regional statistics, especially by sector, than to find or generate district or subdistrict information for tailoring programs to specific needs and to the likelihood of effective response.

Data are rarely available below the district level. The information that is available tends to be severely dated, dubious on methodological grounds, non-random, or the product of rapid appraisal techniques that do not lend themselves to use as large-scale planning tools. This is a very effective barrier to support sustainable responses to poverty. Information that is available only at the regional, or at most district, level is an inadequate guide for creating realistic opportunities for the poor, whose responses are quintessentially local.

In principle, the more responsive a program is to the perceptions and needs of rural people, the more likely it is that they will adopt the new opportunities. Because the poor in Uganda are largely rural, and their adoption of sustainable resource use critical, it is important that programs operate at the lowest level practicable in terms of planning targets, operational structures, and effective monitoring. Better information at lower levels would give the GOU better guidance for building specific interventions for reducing poverty.

The lack of good information for program planning in Uganda affects how the processes of socioeconomic development are thought of, and the potential for change. Because the GOU, USAID, and all the other donors are caught in the same data bind, there should be a strong incentive to support a concerted effort to improve the quality of the information. Though engaging IFPRI is a step in the right direction, a more comprehensive effort is needed to avoid a patchwork solution. Perhaps a USAID-sponsored workshop, in conjunction with the one suggested in the previous section, could tease out the information that all parties need to improve planning around a new decentralized paradigm.

ANNEX A

Amended Scope of Work

SO 7 Assessment of Strategic Options — Scope of Work

A number of discussion were held with senior USAID/Uganda staff (and earlier with USAID/W/AFR/SD staff) to clarify and make modifications to the original scope of work. This was done both in light of a reduction in the level of effort and, more importantly, to reflect changes in the Mission's own evolving perceptions of what information it would find most useful and what the final product ought to contain. The following changes were agreed upon:

Deliverables

1. A work plan and timeline, providing details on an implementation schedule for developing a draft and final report.

2. An overview of critical trends in the areas of environment and use of natural resources as well as such related factors as may impact on the Mission's SO7 objectives. Include a discussion of the Ugandan policy environment that relates thereto and a map of the country's agro-ecological zones.

3. A decision-making framework for selecting among strategic SO7 choices, including key economic and environmental criteria plus more broad-based social criteria related to economic growth and the environment. Such criteria should be useful for targeting programmatic decisions.

4. An assessment analyzing data related to agriculture and the environment in Uganda, including its utility, availability, quality, spatial context and timeliness. Discuss and comment on IFPRI's data gathering efforts. Include any suggestions for additional work for consideration by the Mission.

5. A methodology for ranking intervention options by district, focusing on three key variables: agricultural productivity potential, population, and poverty. Demonstrate how such an approach might be used to identify potential areas of focus for future USAID investments.

6. An assessment that identifies and discusses key strategic level policy issues that are likely to influence USAID/Uganda's choice of investment options.

ANNEX B

Map: Agro-ecosystems

Agroecological zones and farming systems of Uganda.

N

100   0   100   200 Kilometers
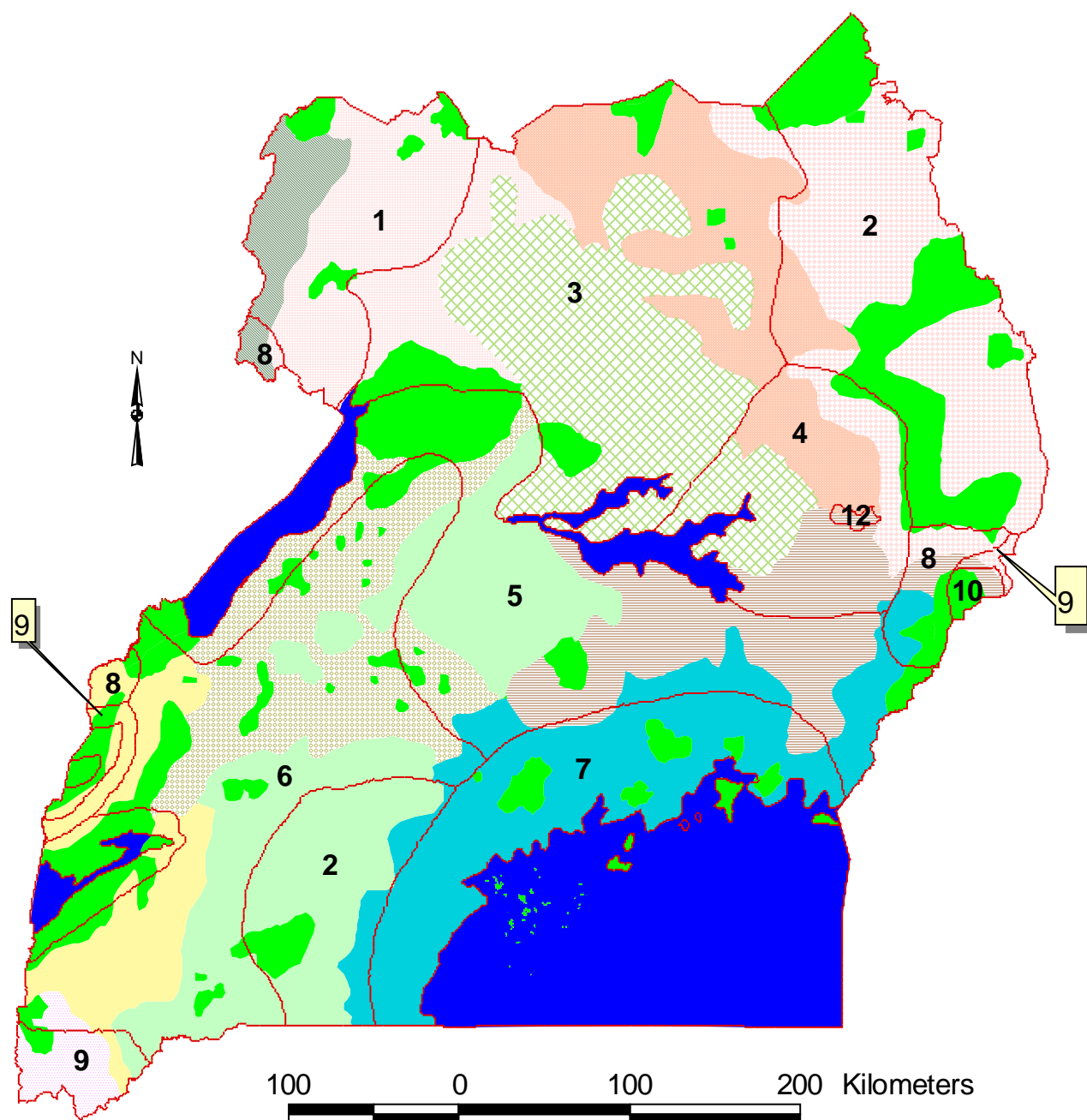
Agro-ecological zones

Central wooded Savanna - 43,352 sq Km.
Lake Victoria crescent/Mbale Farmlands - 94,645 sq. Km
Lakes
North Eastern Semi-arid short grass plains - 84,505 sq. Km
North Eastern central grass/bush/farmlands - 72,912 sq.Km
Northern moist farmlands - 120,165 sq.Km
Northen farmlands/wooded savanna - 40,465 sq. Km

Ptotected areas - 118,072 sq. Kms
South Eastern Lake Kyoga basin - 60,387 sq.Km
South western highlands - 8,815 sq. Km
West Nile Farmlands - 18,872 sq.Km
Western medium high farmlands - 3,976 sq.Km
Western mid-altitude farmlands/semliki flats - 6,599 sq. Km.

Main farming systems

1 - Medium cropping and cattle West Nile System
2 - Pastoral and some annual crops systems
3 - Annual cropping and cattle Northern System
4 - Annual cropping and catlle system
5 - Banana millet cotton system
6 - Weatern banana coffee cattle system
7 - Intensive banana coffee lake shore system
8 - Medium altitude intensive banana coffee system
9 - Montane systems

ANNEX C

Supporting Data for Criteria-Based Selection of Investment Options

	1 District	2 Estimate of Un-utilized Cultivable Area	3 Ranking Potential	4 Cultivable ha/head 2000	5 Cultivable ha/head 2010	6 Poverty "Score"	7 Bottom Q poverty # 2000	8 People/ cult.ha 2000	9 People/ cult.ha 2010	10 People/ farmed ha 2000	11 People/ ha THF	12 People/ ha Woodland	13 People/ ha Wetland
	Adjumani*	1,833	3.21	2.31	2.05	0.5	47,429	0.43	0.49	1.38	146	1	4
	Apac	1,480	1.73	1.03	0.87	1.4	140,690	0.97	1.16	1.31	-	8	5
	Arua	3,086	4.11	0.78	0.62	2.7	273,390	1.28	1.62	2.41	-	3	26
	Bugiri*	157	0.52	0.47	0.42	0.9	85,137	2.13	2.41	2.41	50	27	6
	Bundibugyo	29	0.06	0.23	0.16	0.3	26,220	4.44	6.35	4.79	4	5	2
	Bushenyi	1,053	2.37	0.41	0.32	1.2	119,921	2.44	3.17	3.63	42	45	29
	Busia*	64	0.29	0.33	0.26	0.6	61,404	3.06	3.83	3.36	305	105	6
	Gulu	6,459	6.46	2.41	1.81	1.8	180,365	0.41	0.55	0.97	-	1	7
	Hoima	1,850	2.47	1.10	0.83	0.7	68,825	0.91	1.21	2.31	4	3	11
	Iganga	363	1.64	0.35	0.28	2.7	268,096	2.90	3.55	3.28	67	37	9
	Jinja	14	0.07	0.15	0.11	0.6	63,690	6.64	9.04	6.79	41,090	1,370	37
	Kabale	363	0.73	0.27	0.19	1.1	106,981	3.65	5.25	4.63	74	1,339	50
	Kabarole	3,552	9.77	0.81	0.67	1.4	143,579	1.24	1.49	2.33	10	6	8
	Kalangala*	335	1.34	2.12	1.97	0.0	2,211	0.47	0.51	2.83	7	10	2
	Kampala	(70)	-	-	-	0.3	30,699	-	-	-	-	-	-
	Kamuli	1,159	1.35	0.57	0.45	2.8	275,111	1.75	2.23	2.55	-	23	4
	Kapchorwa	617	3.70	0.69	0.55	0.2	19,303	1.44	1.81	3.42	5	6	13
	Kasese	406	1.63	0.33	0.27	1.0	102,030	3.03	3.77	4.18	11	7	9
	Katakwi*	1,874	1.87	1.84	1.15	0.9	92,989	0.54	0.87*	0.92	994	11	1
	Kibaale*	1,865	4.66	1.35	1.19	0.6	55,860	0.74	0.84	1.54	3	3	4
	Kiboga*	2,315	6.17	1.98	1.64	0.3	34,113	0.51	0.61	1.47	24	1	2
	Kisoro*	86	0.22	0.24	0.17	1.0	103,868	4.25	5.84	4.92	23	-	62
	Kitgum	7,080	7.08	2.71	2.02	3.2	316,929	0.37	0.49	0.77	-	1	8
	Kotido	9,138	6.09	4.11	3.35	1.7	170,149	0.24	0.30	2.07	-	1	3
	Kumi	782	2.09	0.68	0.47	1.0	96,239	1.47	2.15	2.16	-	45	4
	Lira	1,467	1.71	0.93	0.75	1.7	166,031	1.07	1.33	1.41	-	9	5
	Luwero	3,547	15.96	0.98	0.71	1.4	138,429	1.02	1.42	3.50	130	2	3
	Masaka	1,246	6.23	0.33	0.27	1.8	183,496	3.00	3.69	5.14	43	65	10
	Masindi	3,618	10.85	1.45	1.07	1.2	121,229	0.69	0.94	2.11	7	1	3

1	2	3	4	5	6	7	8	9	10	11	12	13
District	Estimate of Un-utilized Cultivable Area	Ranking Potential	Cultivable ha/head 2000	Cultivable ha/head 2010	Poverty "Score"	Bottom Q poverty # 2000	People/ cult.ha 2000	People/ cult.ha 2010	People/ farmed ha 2000	People/ ha THF	People/ ha Woodland	People/ ha Wetland
Mbale	491	2.94	0.21	0.16	2.2	218,424	4.74	6.12	6.26	41	35	25
Mbarara	5,338	15.57	0.79	0.63	0.7	70,550	1.27	1.58	3.67	22	59	8
Moroto	6,483	6.48	2.66	1.74	1.3	132,488	0.38	0.57	2.68	-	2	1
Moyo	1,129	1.32	1.55	1.20	0.4	43,689	1.02	1.42	3.50	130	2	3
Mpigi	1,716	9.44	0.37	0.31	1.6	161,071	2.67	3.28	4.37	17	30	10
Mubende	2,032	6.77	0.87	0.74	1.2	121,716	1.14	1.35	1.83	21	7	7
Mukono	1,620	9.72	0.36	0.28	2.4	240,371	2.78	3.63	4.62	11	55	8
Nakasongola*	2,104	5.61	2.46	2.15	0.3	32,697	0.41	0.47	1.39	52	1	1
Nebbi	1,010	1.85	0.62	0.47	2.0	196,710	1.62	2.13	2.59	2,291	18	30
Ntungamo	681	1.82	0.40	0.30	0.5	45,504	2.48	3.38	4.20	43	213	23
Pallisa	143	0.38	0.33	0.26	1.5	148,237	3.04	3.85	3.35	-	104	6
Rakai	2,036	6.79	0.75	0.66	1.1	114,756	1.33	1.53	3.17	22	33	3
Rukungiri	(185)	(0.62)	0.25	0.18	1.5	147,951	4.06	5.62	3.58	16	293	35
Soroti	1,564	2.74	0.88	0.60	0.3	34,092	1.14	1.66	1.93	2,087	22	3
Ssembabule*	899	3.75	1.29	1.20	1.6	162,889	0.77	0.84	1.33	11	17	3
Tororo	149	0.60	0.31	0.24	1.5	151,637	3.26	4.23	3.59	326	112	6

Observations of Related Donor Activities

The role and focus of other donors is important to consider in USAID's current decision of combining environmental and agricultural initiatives. As a part of this assessment, the team chose to gather information and insights from a selected number of donors. However, it is important to note that this general sampling of donors is in no way all-inclusive or entirely representative of donor input. It therefore stands as a summary of key points and insights given by a limited number of donors in the arena of environment and agriculture. As the Mission already knows the specific profiles of each donor's activities, such a detailed listing is not included in this report.

Royal Netherlands Embassy:

- Focus upon budget support of sectors, under the umbrella of GOU poverty reduction
- New focus areas reduced to 3, environment not included
- Wetlands: in process of making a draft sub-sectoral plan for wetlands with suggestions for other donor involvement
- Suggestions to USAID: intervene at community level in supporting practical use of wetlands training and awareness sessions. Real felt need exists for practical education and research on how much of the wetlands can be used in a sustainable manner.
- Need for an updated hydro-geological map of Uganda. Also, micro-maps at the community level. Education on hydrology/ watersheds at community level.

World Bank:

- Move towards budget support (including continuation of support of NAADS)
- Beginning project in northern Uganda on social fund opportunities
- Perception that USAID is mainly location-specific in regards to environment
- Lake Victoria project- possibility for USAID involvement
- Energy efficiency project

Royal Danish Embassy:

- Agricultural Sector Programme Support (ASPS)
- Issue: lack of support for Environment at government budget level
- Agricultural District Centers (ADC)- supported by World Bank ARTP2, to assist NARO (historically overly focused on ag. extension)
- Issue of lack of expansive data on agricultural productivity (without bias)

European Union:

-Support to Uganda Tourism Board

- Focus on revenue generation
- Potential area of AID intervention: Ssese Islands
- Database monitoring of tourism standards and statistics
- USAID could provide mechanism to support local capacity building
- World Bank working on a ½ million dollar tourism policy framework- legislation
- Possible option: development of canopy walkways in indigenous forests
- Important need for UWA to be willing to accept donor support/ input

-Support to Department of Forestry

- Focus upon biodiversity conservation
- Suggestion to USAID: continue to focus on local community involvement in management
- management plans need to be implemented in north/NE of rift valley
- focus outside protected areas (buffer zones)
- focus on lake Victoria- Ssese islands
- help to strengthen district environmental planning

GTZ

- Ecological monitoring/ monitoring information systems: in protected area
- Murchison Falls monitoring as a prototype for other initiatives
- In light of GOU poverty reduction, three new areas of focus: financial assistance, vocational/institutional training, policy reform & governance/ decentralization
- Environment is no longer a distinct area of funding focus

DFID

- Umbrella Programme/ Uganda Forest Sector Co-ordination Committee
- Focus upon private sector involvement and sustainability
- Goal of focusing and coordinating donor funding
- Suggestion on USAID involvement: should be private sector focused
- Environmental education is key and should come from forest commission
- USAID can become involved in carbon sequestration
- USAID help identify areas of potential for carbon credits (i.e., tree planting in North)

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